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ENVIRONMENT

OLDMAN RIVER RESERVOIR:
RECREATION - TOURISM REPORT
PHASE I

INVENTORY AND ASSESSMENT

Prepared for:

ALBERTA ENVIRONMENT

PLANNING DIVISION

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

The proposed Oldman River Reservoir in Southern Alberta will experience considerable pressure for water and land-based recreation opportunities once construction is completed and filling occurs. This Executive Summary highlights the findings of the recreation capability and market assessment research undertaken as part of the recreation inventory report for the reservoir.

The Project is being undertaken to provide onstream storage and a regulated downstream flow of a dependable supply of water to meet the existing and future municipal, industrial, agricultural and recreation demands of the people living in the Oldman River Basin. The dam is also designed to allow for the future development of hydro-electric potential.

The proposed reservoir is located near the junction of the Oldman, Crowsnest and Castle Rivers in the Municipal District of Pincher Creek. Proximity to Highway 3, mild climatic conditions, large waterbody, varied shoreline, and the scenic backdrop of the Livingstone Range are important factors that will influence use of the reservoir by both resident and non-resident market groups.

2.0 PURPOSE OF PLANNING STUDY

This study was commissioned and directed by the Planning Division of Alberta Environment as part of the environmental mitigation and opportunities plan for the Oldman Reservoir. The firms of Marshall Macklin Monaghan Western Limited and Wood Bay Consulting Group Limited, Edmonton were retained to identify and assess the recreation-tourism opportunities provided by the Oldman Reservoir based upon its biological and physical capability plus market demand. Ownership of lands and possible developers have not been considered. The information contained in this report, along with a proposed concept plan for the area, will be presented to the Municipal District of Pincher Creek to assist them in future land use planning.

In determining the recreation-tourism potential of the reservoir, the key elements of the investigation included:

1. An inventory of present outdoor recreation-tourism activities-developments in the proposed reservoir area and potential impacts.

2. An assessment of the capability and suitability of the shorelands and water surface areas.

3. A priorization of alternative sites for various water-based activities.

4. An evaluation of operational studies of the reservoir and recreation activities both above and below the dam site.

5. An assessment of existing and future market conditions including the demand for various recreation activities-facilities.

6. Identification of existing recreation areas and activities impacted by construction of the reservoir.

3.0 RECREATION CAPABILITY ASSESSMENT

The natural environmental conditions of the reservoir and adjacent shorelands were evaluated to determine their capability-suitability to support a range of recreation activities identified by Alberta Environment. This analysis revealed that the key limiting factors were: lack of mature vegetation cover in areas with potential for development, strong winds, steep slopes separating shoreline and developable backshore, extensive mud flats (i.e., reduced water surface area and access) during drawdown periods and cool to cold water temperatures. The size of the waterbody, tree cover in the river valley upstream and downstream of the reservoir, proximity of Highway 3, and attractive sports fishing and other nearby tourist facilities-attractions are seen as some key positive highlights. Drawdown of the reservoir during the summer period will increase as additional water is required for irrigation and other downstream users. During the first five to ten years of reservoir operation, based on projected irrigation development, summer fluctuation will probably range (75 percent probability) up to 12.5 m. With ultimate irrigation development, summer fluctuation will likely be about 27 m.

Ten candidate sites were identified as having capability to support recreation development based upon field analyses and aerial photo interpretation. Each site was evaluated in terms of several factors including road access, topography-soils, land use conflicts, access to water, off-shore conditions, exposure to prevailing winds, maximum developable area and others. The analysis revealed that all ten sites have relatively limited capability when compared with other natural or regulated waterbodies in Alberta. Furthermore, all the sites, including those with the best recreation potential will require significant forestation and shoreline improvements before they could adequately meet public expectations and general safety in use.

The following is a summary of each candidate site identified on Map 5:

Site A - Southwest Shore Site

- 114 ha, relatively flat
- good road access; conflict with existing land use
- capable of supporting day use, campground and cottage development

Site B - South Central Shore Site

- 20 ha, area separated by slope
- requires road access
- capable of supporting developed campsites, beach area, public marina

Site C - Southeast Shore Site

- 39.6 ha, flat terrace
- potential conflict with existing farms
- capable of supporting broad range of recreation activities-facilities

Site D - Dam Overlook Site

- 10 ha
- good viewpoint
- good road access

Site E - Northeast Arm Site

- 15 ha, pasture land
- requires forestation and road access
- capable of supporting day use beach, open space and institutional camps
- impacted during low water

Site F - North Shore Site

- 11 ha
- good scenic view - faces south
- capable of supporting day use area, institutional camp and beach area

Site G - West Brocket Site

- 60 ha, treed river terrace
- attractive setting 5 km from damsite
- capable of supporting developed campground and day use site

Sites H, I and J. (Peigan Reserve)

- 45, 31 and 33 ha respectively
- semi-treed river terrace
- capable of supporting campground development and canoe access
- upgrading in road access required

The developable area of the sites selected vary as shown from 10 to 114 ha. Most sites have good road access. Each site has the capability to support a range of land-based activities such as picnicking, camping and cottaging and provides reasonable access to the water for beach activities and boat access. Four sites occur on the south side of the reservoir, two on the north side with an additional four sites located downstream of the reservoir between the dam site and the LNID weir. As previously noted, the sites do not vary significantly from one another except in terms of the amount of developable area; some will require extensive tree planting and berming to minimize the impact from the wind. A further requirement of each site will be extensive grading of the waterfront to develop beach areas, recognizing that extensive dry beach areas will occur both prior to and after the reservoir reaches its maximum level in late June.

Specific observations-analysis concerning the recreation capability of the reservoir and adjacent shorelands are as follows:

- the reservoir water temperature will be lower than most natural lakes in the province and this may cause some discomfort;

- the water temperatures of the Oldman River downstream of the dam will be lower and stream velocities higher than those presently experienced, decreasing potential for swimming;
- the sport fishing capability of the reservoir and affected streams has yet to be confirmed by Alberta Environment (part of fisheries assessment Phase II);
- careful site planning is required to minimize any potential conflict between recreation uses-facilities and existing farm and non-farm buildings;
- significant cultural and wildlife resources of interest to tourists occur in the study area and will complement traditional water-based activities;
- a number of areas are suitable for cottage and campground development although extensive planting would be required;
- the reservoir is capable of accommodating a large number of boats for fishing and water skiing;
- wind conditions make the reservoir highly desirable for windsurfing but will be a constraint at times to fishing and power boating activities;
- the river sections above the dam will not be affected by the reservoir for canoeing/kayaking. Increased stream flow below the dam to the LNID weir will improve conditions during late summer and early fall; and
- the river valley sites below the dam are well treed, attractive and sheltered. They are, however, located a significant distance from the reservoir.

4.0 PREFERRED RESERVOIR LEVELS

The period of maximum recreation potential will occur when the reservoir is at or near full storage level (1118.6 m). The analysis revealed that the highest benefits will occur between reservoir elevations 1118.6 and 1117.0 m. A low impact range was identified as being 1116.9 to 1114.0 m, moderate to high impact range 1113.9 to 1110.0 m and the high impact to unsuitable range was identified as being water levels below 1110.0 m. It is anticipated that the amount of time the reservoir will be at the maximum to moderately suitable levels will decrease significantly over time as the demand for water increases.

5.0 RECREATION MARKET ASSESSMENT

Research undertaken in the Oldman River Basin consistently supports the need for additional land and water-based facilities at natural and regulated waterbodies. Our investigations indicate that there are four target markets to be considered in the planning of the reservoir facilities including: the local, regional, provincial and non-resident markets.

Use of government operated recreation areas on reservoirs in southern Alberta has dropped off in recent years due to the deterioration in water conditions/levels as a result of the drought in the region. Projected increases in the population will, however, increase the size of certain market segments. Other factors affecting recreation use on the reservoir include the strong position of the American dollar attracting tourists to the region and continued development of new regional attractions in Chinook Country.

A wide range of land and water-based activities were identified as having good to excellent growth potential. Such activities include: picnicking, swimming, waterskiing, power boating, canoeing, sailing, fishing, camping and windsurfing. It was further observed that marketing and programing for these activities would have a significant impact on the demand. Using a computer model, it was predicted that there would be a demand for 117 campsites by the year 2005. No specific estimates could be generated for cottage demand due to the limited opportunity in the region. The analysis also revealed that there is insufficient demand to warrant construction of additional fixed-roof accommodation such as motels.

During and following construction, significant visitation will occur at the dam site assuming that good access, parking and interpretive facilities are established. Based on experience gained from other reservoir projects, the Oldman project could generate between 80,000 - 96,000 visitors per year during the construction period and 40,000 - 52,000 following construction.

6.0 PUBLIC SURVEY ATTITUDES AND PERCEPTIONS

Surveys were taken of special interest groups, land owners and high school students in the Pincher Creek area. The results indicated that while many of the local residents intend to use the reservoir for summer activities, they felt the potential for winter use would be limited. The majority of respondents felt that recreation developments at this reservoir should consist of public facilities to compensate for recreation losses resulting from the creation of the reservoir. Those individuals directly impacted by the reservoir were most negative toward potential recreation developments while those furthest away or residing in adjacent communities were most positive toward possible recreation facility development. Several respondents indicated that the private sector should have an opportunity to develop land for recreation purposes.

Local residents of the Pincher Creek area were asked to give their opinion with respect to ten major issues perceived to be associated with the recreational use of the reservoir. Each issue was examined in terms of its level of importance as recognized by the local residents. It was discovered that local residents are concerned about such issues as vandalism and trespassing on their land as a result of the potential influx of tourists to the reservoir. Those issues perceived as "very important" were: landowner access to the reservoir, separation of land, access for stock watering, property loss through slumping, reservoir levels affecting livestock and noise pollution.

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1.0 INTRODUCTION

1.1 Oldman River Reservoir Project

The Oldman River Reservoir Project, being constructed by Alberta Environment, will impound water from the Oldman, Crowsnest and Castle River watersheds by a dam located in the Municipal District of Pincher Creek approximately 10 km (6.5 miles) north of the town of Pincher Creek. The Project is being undertaken to provide onstream storage and a regulated downstream flow of a dependable supply of water to meet the existing and future municipal, industrial, agricultural and recreation demands of the people living in the Oldman River Basin. The dam is also designed to allow for the future development of hydro-electric potential. The proximity of the dam to Highway 3, the area's mild dry climate and scenic mountain landscapes will encourage use of the reservoir and adjacent shorelands by local as well as destination and pass-through travellers in southern Alberta.

Alberta Environment is responsible for the planning and construction of the reservoir as well as related impact assessment studies. This study was commissioned and directed by the Planning Division of Alberta Environment as part of the environmental mitigation and opportunities plan. The information contained herein provides an assessment of the recreation/tourism opportunities provided by the Oldman Reservoir based upon its biological and physical capability plus market demands. Ownership of lands and possible developers have not been considered. The information in this report, along with a proposed concept plan for the area, will be presented to the Municipal District to assist them in future land use planning.

In the preparation of this report valuable input was received from a Technical Advisory Committee which included representatives from Alberta Environment, Alberta Recreation and Parks, Municipal District of Pincher Creek, Chinook Country Tourist Association, Oldman River Regional Planning Commission, and a Local Recreation Advisory Group, appointed by the Municipal District of Pincher Creek. This group consisted of four representatives of the municipal district and one each from the Town of Pincher Creek and the Village of Cowley.

Alberta Environment retained the firms of Marshall Macklin Monaghan Western Limited and Wood Bay Consulting Group Limited to undertake an inventory of existing recreation facilities and uses and an assessment of the recreation-tourism potential for the reservoir and to develop a conceptual plan outlining the most appropriate recreation uses.[1]

1.2 Objectives and Terms of Reference

An initial overview study was undertaken in 1985 by Alberta Environment, Planning Division, to review existing information sources that could help in the identification of recreation facilities and general activities occurring within the immediate reservoir site as well as the surrounding region. Based upon the findings of that report, the team conducted a more detailed investigation to assess recreation and tourism opportunities/constraints as well as the relationship between reservoir levels and river flows and water oriented recreation. To assess the recreation opportunities associated with the reservoir, the following objectives were developed for this study:

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[1] The report was prepared under the direction of D.L. Adams, Project Director, with environmental analysis completed by W. Strong, Wood Bay Consulting Group Limited.

1. Develop an inventory of existing outdoor recreational-tourism activities and uses of the lands in the proposed reservoir area, the Oldman River downstream to the LNID headworks in the Peigan Indian Reserve, the Crowsnest River upstream to Burmis, and a 10 km section of the Oldman and Castle Rivers upstream of the reservoir using existing published information, local resident interview data, and field reports.

2. Evaluate and update information in the recreation overview study prepared by Alberta Environment (1985).

3. Assess the capability and suitability of the shorelands and water surface areas associated with the proposed reservoir and related river reaches; and identify potential natural and man-made hazards to recreational users of the adjacent lands of the reservoir.

4. Identify reservoir and river shoreline opportunities both capable and suitable for supporting recreation and tourism activities. Evaluate and priorize areas for various water-related recreation activities around the reservoir for use by public agencies including the Municipal District of Pincher Creek and the Oldman River Regional Planning Commission.

5. Identify potential problem areas between outdoor recreation-tourism activities and facilities; and other existing land and water uses in the study area (i.e., increased traffic volume, dust, trespassing, vandalism, etc.).

6. Provide an assessment of recreation activities that are most compatible with current studies of possible operating conditions.

7. Identify opportunities to maximize the reservoir's potential to accommodate outdoor recreation and tourism opportunities in relation to other lakes and reservoirs in the region.

8. Develop three recreation development opportunity concept alternatives outlining the most appropriate uses that can be accommodated (not included in the Phase I inventory report).

1.3 General Location and Study Area

The Oldman Reservoir will be located on the Oldman River approximately 10 km north of the Town of Pincher Creek and a similar distance upstream from the Village of Brocket on Highway 2 as shown on Figure 1. The project will involve three river systems within the South Saskatchewan Basin. They are, from south to north, the Castle and the Crowsnest which are tributaries to the third river, the Oldman. The Oldman and Bow Rivers, which converge north-east of Taber in south-central Alberta, form the headwaters of the South Saskatchewan River.

For the purposes of this investigation, three separate areas of investigation have been identified:

1. The reservoir surface area and the shoreland zone within one kilometre of the reservoir's full supply level (FSL) shall be referred to as the primary study area;

2. A secondary area of influence extending beyond the prime study area for 2 to 3 km and includes upstream sections of the Castle, Crowsnest and Oldman Rivers; and

3. A section of the Oldman River downstream of the dam site to the LNID headworks.

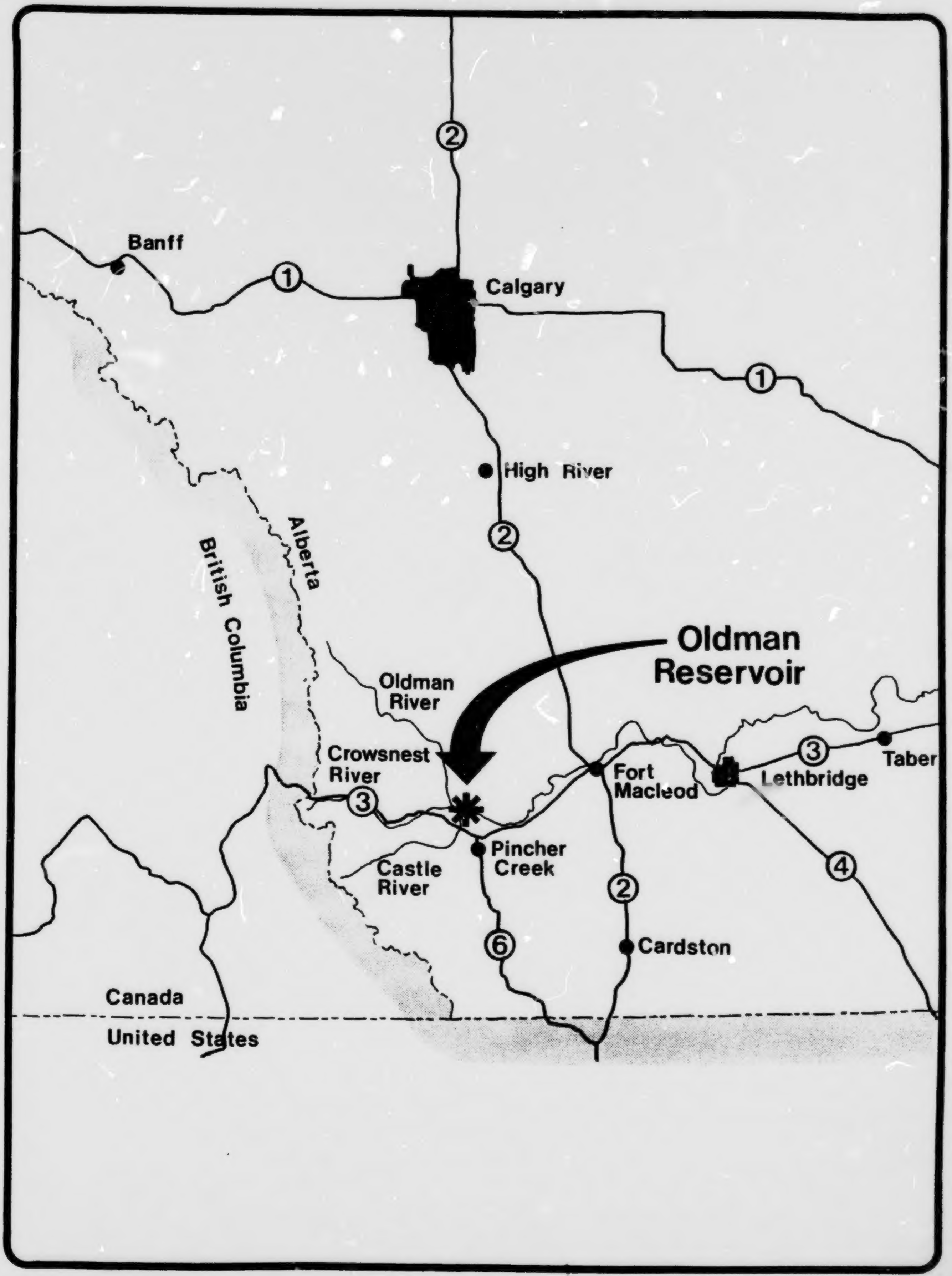


Figure 1. Regional Setting

The principal emphasis was on the primary study area as this zone was considered to have the greatest potential to support recreation.

1.4 Methodology

Following the selection of the consulting team, a pre-project planning session was held October 3, 1986, at Pincher Creek with the Technical Advisory Committee to confirm and initiate a work program for the project. It was concluded that Part III of the original Terms of Reference, concerning detailed site plans and mitigation measures to minimize potential hazards and conflicts, would be undertaken in a separate contract. The Technical Advisory Committee and the Local Recreation Advisory Group recommended that the consulting team include in the public participation program a questionnaire survey of the land owners, special interest groups, and others.

The work program developed by the consultants provided the study process or methodology used by the team to generate the data required to identify potential recreation and tourist sites (Figure 2). The approach was flexible to allow for government agencies, other consultants, and the public to provide input and changes as needs dictated. A large number of related studies were ongoing at the time of this project which directly affected the scheduling of various recreation planning considerations.

The emphasis of the study process was directed at those elements affecting the identification of potential recreation and tourist sites at the reservoir. As outlined in the flow chart, basic aerial photograph and field analysis was undertaken to determine the characteristics of the landscape, and its capability to support alternative recreation uses (Figure 2). Following the initial assessment of shoreland and backshore areas, a final site

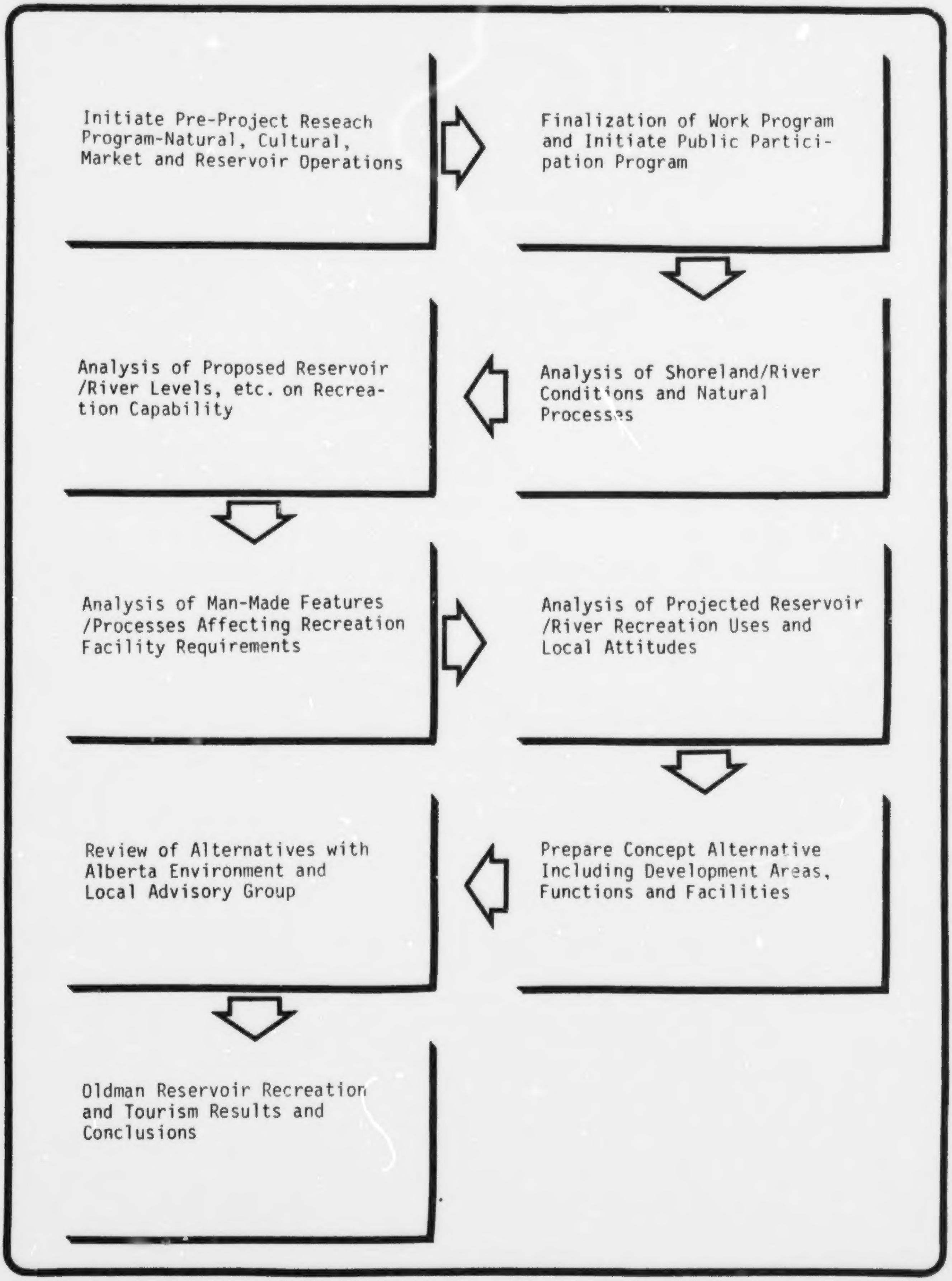

Initiate Pre-Project Reseach Program-Natural, Cultural, Market and Reservoir Operations
Finalization of Work Program and Initiate Public Participation Program
Analysis of Shoreland/River Conditions and Natural Processes
Analysis of Proposed Reservoir /River Levels, etc. on Recreation Capability
Analysis of Man-Made Features /Processes Affecting Recreation Facility Requirements
Analysis of Projected Reservoir /River Recreation Uses and Local Attitudes
Prepare Concept Alternative Including Development Areas, Functions and Facilities
Review of Alternatives with Alberta Environment and Local Advisory Group
Oldman Reservoir Recreation and Tourism Results and Conclusions

Figure 2 Work Program Flow Chart

investigation was carried out to confirm and priorize the candidate area.

Following the initial environmental investigation, available data was collected and assessed concerning the current demand for various activities and facilities. This data was then assessed in terms of future trends.

With a good understanding of the natural environmental factors and market conditions, the team will prepare three alternative concept plans based on various philosophies (goals and objectives). These alternatives will be refined through discussion and review with the Technical Advisory Committee and the Local Recreation Advisory Group. The preferred concept plan for development will be functional and should reflect the objectives and planning consideration of agencies such as Alberta Environment, Alberta Recreation and Parks and the Chinook Country Tourist Association and the Municipal District of Pincher Creek. It was recognized that the lack of trees, strong westerly winds, widely fluctuating reservoir levels, and the high investment cost of road construction required a creative approach to providing suitable recreation and visitor comfort. The preferred concept plan should be developed in sufficient detail to communicate the basic philosophy, key components, and phasing necessary to reflect market conditions.

1.5 Public Participation Process

An analysis of the local and regional markets was considered an important component in the planning process. The public participation program included several distinct components in addition to ongoing liaison with Alberta Environment and the Local Recreation Advisory Group.

The first component consisted of meetings with the Local Recreation Advisory Group to obtain their general view of potential recreation benefits, constraints, and concerns. This was followed by the development of several questionnaires (assisted by Alberta Environment) and dissemination by the Local Recreation Group to land owners and special recreation interest groups. An open house was held on March 6, 1986 in conjunction with other components to inform the community regarding the progress made in the various studies. A second open house will be held to present the three development opportunity concept alternatives to the community and encourage the local people to highlight special interest concerns regarding the alternative proposals at a stage in the planning process when adjustments can be readily accommodated.

The consulting team believes that the degree of public involvement in the recreational planning process is directly related to:

1. Establishment of an accurate understanding of community needs and wants as they relate to recreation-tourism development;

2. Appreciation of the potential implications to local land owners that may be directly or indirectly affected by recreation uses;

3. Identification and assessment of special planning-design considerations when examining alternative locations, types and scales of recreation developments; and

4. Attainment of an understanding of the willingness and ability of the community (individuals and groups) to become involved in the potential capital development and operation of recreation developments.

In this report, considerable resources were directed at identifying public needs, interests, and concerns in order to prepare three development opportunity concept alternatives that reflect the range of public opinion on the potential use of the reservoir for recreation purposes.

2.0 RECREATION CAPABILITY ASSESSMENT

2.1 Introduction

In this chapter, consideration is given to the resource base within the study area and its capability to support different recreational opportunities. This chapter has been organized in a systematic manner to permit a logical and comprehensive understanding of the recreational and non-recreational use of the resource base in the study area. Following a description and assessment of the significant resources, including reservoir and river fluctuations, the capability-suitability of candidate recreation areas is outlined including the impact of the proposed reservoir operating plans on these areas over the next five to twenty-five years.

2.2 Overview of the Study Area: Natural Resource Characteristics

2.2.1 Oldman Landscape Pattern and Character

The natural resources of the study area were assessed through a combination of literature review, aerial photograph interpretation (1:10,000 scale), and field reconnaissance. The results of these analyses were organized into a biophysical landscape classification and mapped at a scale of 1:25,000. A hierarchical system was used for mapping with the basic unit of classification being the "ecosection" (equivalent to Land Section of Subcommittee on Biophysical Land Classification 1969) which was defined as a recurring pattern of landform, slopes, soils, and vegetation. In addition, map polygons were separated into climatic zones. By identifying landscape units with similar climatic, topographic, vegetation, and site conditions, it is possible to directly compare and identify sites with similar potential from different geographical localities. However, it should be recognized that variations will occur within any classified unit, and since a biophysical analysis is not a detailed procedure, variations within classification units should be expected. However, what is important is that the areas are sufficiently "similar" at the chosen scale, to allow evaluation of their capability for various land uses.

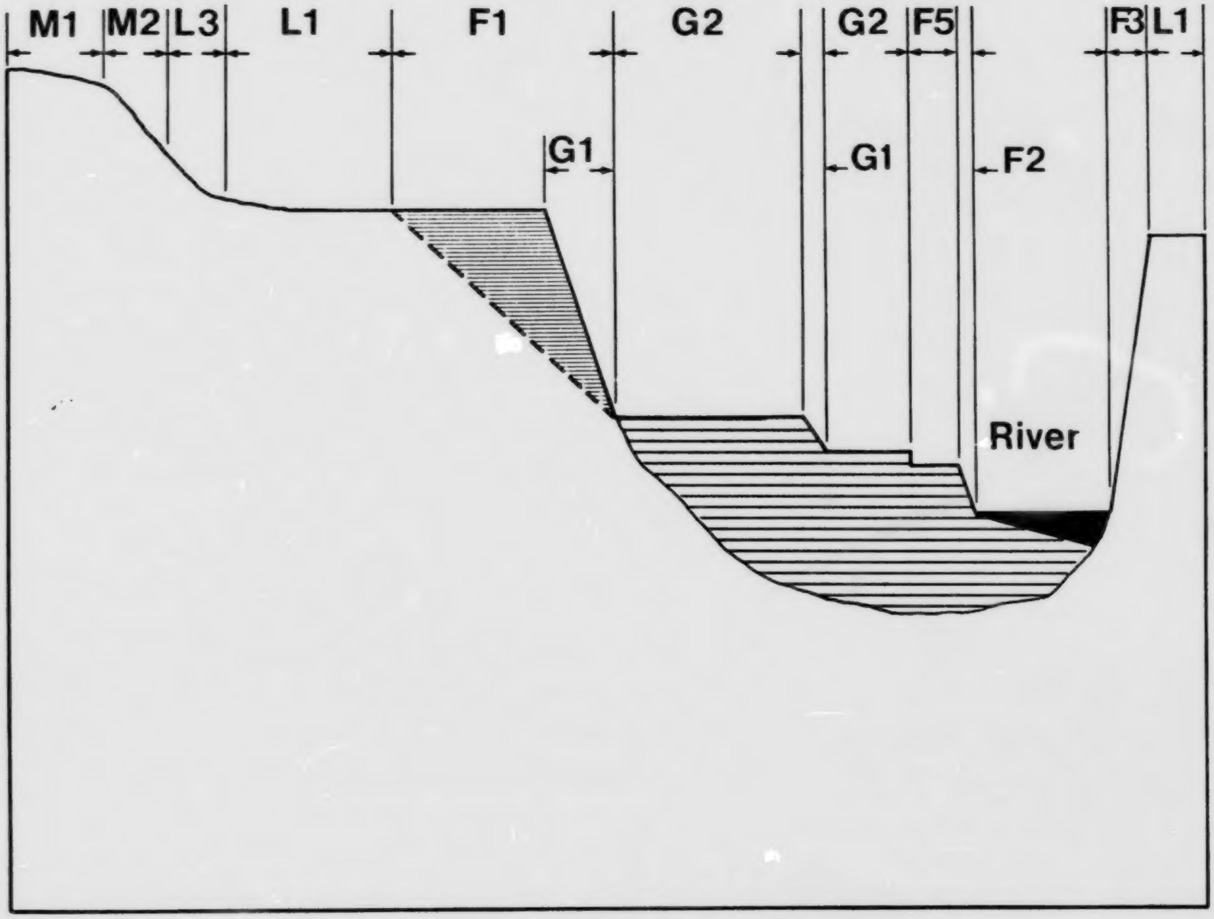
In the mapped area, only one climatic region (Fescue Grassland) was recognized. The study area did border on two other ecoregions (Aspen Parkland and Montane). Four major landform components were recognized: lacustrine plains, morainal uplands, glacial/ postglacial fluvial (inactive) features, and various fluvial landforms. Each of these landform components were further subdivided into a total of seventeen ecosections. Approximately 400 separate polygons were mapped (see Map 1).

The study area occurs within the Fescue Grassland Ecoregion (Strong and Leggat 1981; Zoltai and Strong 1986) which represents the western extreme of prairie vegetation in Canada. Geographically, it forms a zone that parallels the Rocky Mountains between Cardston and Airdrie. The Fescue Grassland is typically characterized by the co-occurrence of rough fescue and Parry oatgrass on Black Chernozemic soils (Moss and Campbell 1947; Moss 1944); however, a mixture of wheatgrass (Agropyron smithii) and June grass (Koeleria nacrantha) is common within the study area (Hardy Associates, 1986), which is probably a disclimax created by many years of domestic cattle grazing. The Aspen Parkland and Montane climatic zones occur on the western and northern boundaries of the study area. These two climatic zones have developed west (Rocky Mountain foothills) and north (Porcupine Hills) of the primary and secondary areas where temperatures are cooler and moisture availability is more abundant than in the study area due to increased elevations. Also associated with these changes in topographic and climatic conditions is a gradual dehumification of the soils and the corresponding development of Eutric Brunisolic soils.

Ecologically, the Aspen Parkland and Montane Ecoregions are represented by the common occurrence of aspen (Populus tremuloides) and conifers (i.e., limber (Pinus flexilis) and lodgepole pine (Pinus contorta)), respectively.

Land within the vicinity of the Oldman Reservoir is composed primarily of glacial lake bed (lacustrine) sediments (3L units) which were superimposed on glacial till deposits (3M units) that overlay sandstone bedrock. Gently sloping lacustrine plains form the general topography that surrounds the reservoir site, and comprises approximately 45 percent of the land within the primary and secondary study areas. These are important croplands because of the highly favorable topography. Moraine deposits become exposed at the outer margins of the lacustrine deposits and on major topographic ridges which remained above the local glacial lakes (Figure 3). Much of the local topographic relief outside of the river valleys is created by the topography of the underlying bedrock. The influence of the bedrock was particularly evident where ridges occur in the central portion and outer margins of the study area, except the eastern end.

Sediments deposited in the glacial lake "Caldwell" (Alley 1973; Alley and Harris 1974) by meltwater streams in the upper portions of the Castle, Crowsnest, and Oldman Rivers resulted in the development of alluvial fans and outwash plains (3G4 units). Coarse sediments were deposited nearest the shore while finer clastics were deposited furthest from the shore. Geomorphically, these subtle features were distinguishable by their coarse texture. They are usually located on the margins of river valleys such as in the Lundbreck Falls and Peigan Indian Reserve areas. Subsequent drainage of the lake due to glacial ice retreat resulted in the formation of incised meltwater channels



General Topographic Position of Ecosections in the Oldman Reservoir Area

SEE TABLE 1 FOR LEGEND

Figure 3 Schematic Topographic Cross-section

which today represent the major valley walls (3G1) of the Oldman River and lower segments of the Castle River. Valley walls are usually steeply sloping. Between the valley walls occur numerous terraces (3G2) with gently undulating surfaces that have developed from repeated episodes of aggradation followed by subsequent downcutting. Postglacial terraces and fans represent the primary sources of aggregate for the construction industry. In the lower portions of the river valley there are modern fluvial streams and their associated river banks (3F2 units), terraces (3F5 and 3F6), and nip slopes (3F3 units). The primary distinction between modern (3F5 and 3F6 units) and postglacial terraces (3G2) is the fact that the latter are directly influenced by the active fluvial erosion and depositional process. In addition, 3F units commonly had juvenile soils and wood vegetation such as cottonwood (Populus spp.) stands as opposed to Chernozemic soils and grassland vegetation which typified 3G2 map units which are more xeric. Also associated with the present stream and river system is a network of ravines (3F1 units) which can have intermittent stream flow. Ravines usually have steep walls that show evidence of erosion, particularly in their mid and lower sections, and are aligned perpendicular to the valley. These landforms developed best where the valley is deep, such as in the area immediately north of the dam site. Scattered examples of slope failure (slumps-3F7, 3F8 and G3 units) were observed in/near the study area with most occurring along valley walls in association with coarse-textured subsurface deposits and the upstream segments of the river valleys (e.g., upper reaches of the Oldman River). Fluvial features compose 10 to 15 percent of the study area, with ravines forming the dominant component.

The segments of the Oldman, Castle, and Crowsnest River valleys which occur immediately upstream but outside the study area, have many of the fluvial landforms described for the main study area.

However, the topography surrounding the mid and upper sections of these rivers is much more rigorous. In these areas, foothills topography created by folded and faulted bedrock is common and the climate and vegetation change to a more Parkland-Montane character (i.e., forest vegetation becomes more abundant). Table 1 summarizes some of the basic characteristics of the ecosection.

2.2.2 Climatic Considerations

Table 2 summarizes the recorded temperature and precipitation conditions of the study area. In general, the area is characterized by maximum temperatures during July and August which have a combined average of approximately 16° C. These temperatures are cooler in comparison with other southern Alberta communities such as Medicine Hat, Brooks, and Lethbridge, but comparable to Calgary and Edmonton, and warmer than Banff, Kananaskis, or Jasper.

Precipitation is relatively low within the study area when compared with other Canadian localities, since it occurs within the Rocky Mountain rainshadow. However, the total amounts of precipitation in the Cowley-Pincher Creek area is equal to or greater than most sites in Alberta, except mountain localities where values are usually much greater. Maximum monthly precipitation occurs during June (approximately 80 mm) with an annual total of approximately 520 mm. Precipitation amounts are probably greatest in the extreme western portion of the study area, but are relatively similar throughout the majority of the area. Precipitation in the form of snow does occur in all months of the year except July and August, although it is primarily confined to the October to early May period. Total snowfall averages 2 to 3 m during the winter; however, redistribution by wind and melting by chinooks reduces snow cover on upland sites to 20 to 30 cm. It has been estimated that 15 to 35 chinook days

TABLE 1

ECOSECTION CHARACTERISTICS

MAP UNIT	LANDFORM	DOMINANT VEGETATION	SURFACE TEXTURE	DRAINAGE	PERCENT SLOPE	SOIL SUBGROUPS
3F1	Ravines	Grassland with secondary amounts of low shrub	Loamy Sand	Well-Moderate	30-60	Orthic Regosols, Eutric Brunisols
3F2	Stream Channel Walls	Viable to Unvegetated	Variable	Well	+30	Orthic Regosols, Eutric Brunisols
3F3	Nip Slopes	Unvegetated	Variable	Well-Rapid	+60	Orthic Regosols
3F4	Undifferentiated Drainage Channels	Grassland with secondary amounts of shrub vegetation	Sandy Loam	Poor-Moderate	0-30	Orthic and Gleyed Regosols, Rego Gleysol
3F5	Upper Stream Terraces	Cottonwoods	Loamy Sand over Gravel	Moderate	2-5	Eutric Brunisols, Orthic Regosols
3F6	Lower Stream Terraces	Unvegetated to Shrubs	Loamy Sand to Gravel	Moderate-Poor	0-5	Orthic Regosols, Rego Gleysols
3F7	Slumps	Grassland	Silty Clay Loam	Well	+9	Black Chernozem
3F8	Slumps	Grassland with secondary quantities of Aspen	Loamy Sand	Moderate	+15	Black Chernozem, Eutric Brunisols
3G1	Valley Walls	Grassland with a small percent of low shrub	Sandy Loam	Well-Moderate	15-30	Black Chernozems
3G2	High Terraces	Grassland and Cropland	Sandy Loam over Gravel	Well	2-9	Black Chernozems
3G3	Slumps	Aspen with secondary quantities of grassland	Loamy Sand	Moderate-Well	+15	Eutric Brunisols, Black Chernozems
3G4	Outwash Plains	Grassland	Loam-Loamy Sand	Well	2-5	Black Chernozems
3L1	Lacustrine Plain	Cropland/Grassland	Silty Clay Loam	Moderate-Well	2-5	Black Chernozems
3L2	Sloping Lacustrine Plain	Grassland/Cropland	Silty Clay Loam	Moderate-Well	5-15	Black Chernozems
3L3	Steeply Sloping Lacustrine Plain with occasional sandstone bedrock exposures	Grassland with a small percent of low shrub on north slopes and limber pine on sandstone outcrops	Sandy Loam	Well	15-30	Black Chernozems, Eutric Brunisols
3M1	Morainal Plain	Cropland/Grassland	Sandy Loam	Moderate-Well	2-9	Black Chernozems
3M2	Sloping Moraine with occasional sandstone bedrock exposures	Grassland with occasional occurrence of limber pine on sandstone outcrops	Sandy Loam	Well-Moderate	15-45	Black Chernozems, Eutric Brunisols

TABLE 2

SUMMARY OF TEMPERATURE AND PRECIPITATION CONDITIONS IN THE COWLEY-PINCHER CREEK AREA[a]

LOCATION	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
						Mean Annual Temperatures (C)							
PINCHER CREEK TOWN	-10.2	-5.2	-2.6	3.4	9.2	13.3	16.5	15.4	10.9	6.1	-1.5	-6.1	4.1
PINCHER CREEK (N. of Town)	- 9.5	-4.7	-2.4	3.7	9.4	13.2	16.5	15.5	11.4	6.6	-0.9	-5.5	4.4
COWLEY AIRPORT	-10.4	-5.6	-2.9	3.0	8.9	13.1	16.0	15.2	10.7	5.8	-1.9	-6.5	3.8
Average	-10.0	-5.2	-2.6	3.0	9.2	13.2	16.3	15.4	11.0	6.2	-1.4	-6.0	4.1
FORT MACLEOD	- 9.5	-4.8	-1.7	5.0	10.8	15.1	18.3	17.1	12.2	7.5	-0.3	-5.0	5.4
MEDICINE HAT AIRPORT	-12.6	-7.7	-2.8	5.6	12.3	16.6	19.9	18.9	13.2	7.4	-1.6	-7.6	5.1
EDMONTON INT'L AIRPORT	-16.4	-11.4	-6.7	3.2	10.1	14.1	15.8	14.8	9.8	4.7	-5.5	-13.1	1.6
JASPER	-12.8	-6.5	-2.7	3.3	8.7	12.4	15.1	14.2	9.8	4.7	-3.9	-9.2	2.8
						Total Precipitation (mm)							
PINCHER CREEK TOWN	40.9	34.9	36.9	51.9	78.5	99.5	42.4	62.8	47.6	24.5	30.9	35.9	589
PINCHER CREEK (N. of Town)	32.6	25.7	29.6	61.6	71.8	84.2	45.1	50.6	52.7	28.1	31.0	30.4	543
COWLEY AIRPORT	38.8	34.0	26.9	41.4	57.4	78.1	39.9	49.3	37.4	22.8	27.9	43.2	497
Average	37.4	31.5	31.1	51.6	69.2	87.3	42.5	54.2	45.9	25.1	29.9	36.5	543

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[a] Source: Atmospheric Environment Service (1982).

occur during the December to February period, minimizing opportunities for cross-country skiing and snowmobiling at the reservoir. Only leeward slopes of the ravine or valley walls may have deep snow that persists throughout the winter and into the late spring.

Wind is the most significant climatic factor in the study area and is a major constraint to water and land recreation (increased discomfort level and hazard level). Based on data from Cowley Airport, a site near Pincher Creek, and a site 6.5 km north of Pincher Creek; it is clear that strong and persistent westerly winds are common (Table 3). For example, more than 50 percent of all winds originate from the west and will blow down the reservoir at an average of 28 to 29 km/hour. Since calm conditions occur less than 14 percent of the time, this also implies that strong winds (greater than 20 km/hour) occur for approximately six months each year. Wind intensity is least during the July through September period (Table 3). In the Cowley Airport area, north winds of moderate intensity are common. These northerly winds are westerly winds which have been deflected around the Porcupine Hills. Westerly winds which average approximately 23 km/hour during the winter are approximately 6 km/hour greater than summer values. Such wind values are several km/hour greater than more northerly areas such as Fort Vermilion, Fairview, Edmonton, or Jasper, but typical of prairie settings such as Suffield (Table 4). Wind will be a significant factor in limiting recreation in the Pincher Creek area. It will certainly affect the user satisfaction while participating in activities such as camping, picnicking or boating. At the same time, however, it must be recognized that constant wind conditions are necessary for wind surfing and, therefore, is an important positive attribute of the reservoir for this growing activity.

Table 3

SUMMARY OF WIND INTENSITY IN THE COWLEY-PINCHER CREEK AREA[a]

	Mean Wind Speed (km/h)												
LOCATION	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR
PINCHER CREEK TOWN	23.5	22.9	19.7	20.1	17.9	17.6	15.2	15.5	17.4	23.3	21.9	22.7	19.8
PINCHER CREEK (N. of Town)	23.8	24.9	22.9	19.2	22.1	20.6	17.3	15.8	17.1	22.9	25.2	26.4	21.5
COWLEY AIRPORT	19.5	19.1	19.1	18.9	17.6	18.1	15.8	16.0	17.5	20.7	22.2	24.9	19.1
Average	22.3	22.3	20.6	19.4	19.2	18.8	16.1	15.8	17.3	22.3	23.1	24.7	20.1
SUFFIELD AIRPORT	17.3	17.6	18.3	19.8	19.6	18.6	17.5	17.3	17.8	19.1	17.9	18.2	18.3
EDMONTON (Stony Plain)	11.1	11.0	11.1	12.3	12.5	11.6	10.5	10.0	10.8	11.9	11.0	11.3	11.3
FAIRVIEW	10.4	11.4	11.3	12.2	13.3	11.8	10.6	10.1	10.7	12.2	10.5	10.3	11.2
JASPER	10.3	9.7	10.0	9.7	9.3	8.8	8.3	8.3	8.4	9.6	9.6	10.2	9.4
FORT VERMILION CDA	7.5	8.1	9.1	10.0	9.5	7.9	7.3	6.9	8.0	9.2	8.3	7.0	8.2

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[a] Source: Atmospheric Environment Service (1982).

Table 4

ANNUAL WIND SPEED AND FREQUENCY VALUES FOR THE PINCHER CREEK AREA[a]

DIRECTION	Pincher Creek Percent Frequency	Pincher Creek Speed (km)	N. of Pincher Creek Percent Frequency	N. of Pincher Creek Speed (km)	Cowley Airport Percent Frequency	Cowley Airport Speed (km)
N	0.7	12.1	1.5	7.9	23.2	14.2
NNE	0.8	14.5	—	—	0.6	13.0
NE	1.8	11.9	5.7	11.2	1.7	10.4
ENE	1.6	11.7	—	—	0.3	14.1
E	3.7	9.8	6.9	8.9	4.2	12.4
ESE	2.8	10.1	—	—	1.0	15.6
SE	2.5	9.8	6.5	9.8	7.2	12.9
SSE	1.3	10.5	—	—	0.9	13.4
S	1.9	10.3	3.2	9.3	5.4	12.3
SSW	1.3	12.2	—	—	1.4	22.0
SW	6.0	18.3	**12.3**	**22.2**	**14.8**	**27.4**
WSW	**18.1**	**29.1**	—	—	**7.6**	**31.0**
W	**36.3**	**27.9**	**57.7**	**26.8**	**18.6**	**27.5**
WNW	5.5	16.6	—	—	0.9	18.3
NW	1.5	12.3	6.0	14.2	4.3	11.7
NNW	0.5	13.1	—	—	2.6	15.2
Calm	13.7	0.0	0.2	0.0	5.3	0.0

[a] Source: Atmospheric Environment Service (1982c)

2.2.3 Reservoir Operating Characteristics and River Fluctuations

Water levels within the Oldman River reservoir will vary seasonally and with time. For example, during the initial years of the reservoir, water levels will most likely fall within the 1110 to 1115 m range during winter months, and rise to the full supply level (FSL) (1118.6 m) during May, June and part of July (Figure 4). With time (up to twenty years), water levels may not reach FSL during the summer. However, the duration of this period of high water will become increasingly shorter until the maximum of 69,000 ha (170,000 acres) of increased irrigation land is reached. Figure 5a illustrates the expected decline in mean reservoir levels with time and their relationship to demand for water (Figure 5b). This decline in mean summer water was estimated at 30 cm/year. In addition to a shorter period of full supply water levels, the range between high and low values will become increasingly wider with time. It is expected that annual water level fluctuations will reach at least 27 m with ultimate irrigation development, with summer fluctuations only slightly less (23 m). However, during the first five to ten years of reservoir operation, summer fluctuations will probably (75 percent probability) range up to 12.5 m.

The principal concern with fluctuating reservoir water levels on recreation is the extent of shoreland exposure. Based on current studies of possible operating conditions (Alberta Environment, unpublished data) and 1:5,000 contour maps, it was found that several geographical areas will be significantly influenced by fluctuating and declining water levels over a 1 to 15-20 year operating period, assuming the demand for water and the available water input respond as predicted. During all years of operation, the seasonal and annual declines in water levels will result in the exposure of shoreline around the periphery of the reservoir. This zone is generally evenly distributed, except in the

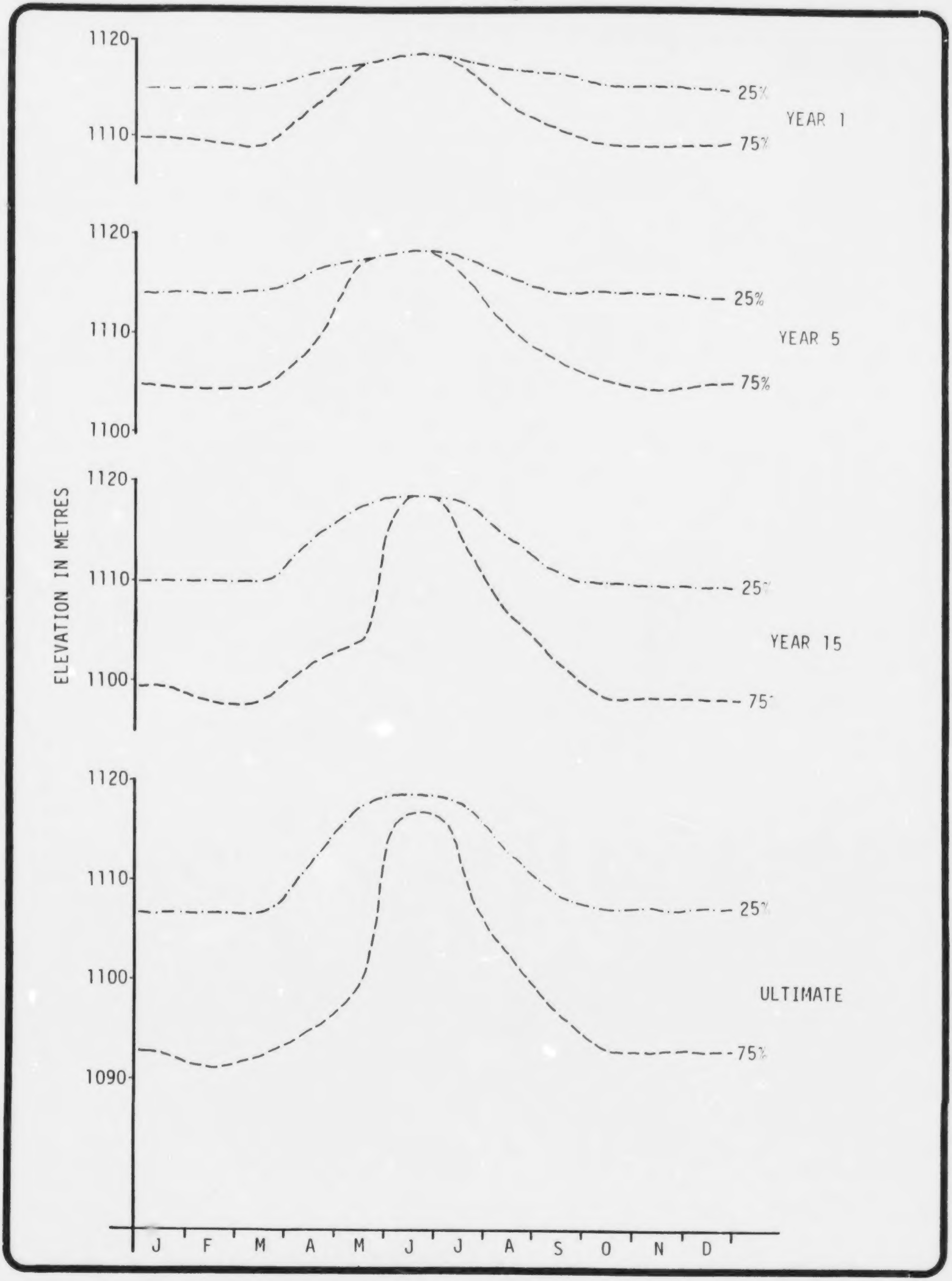

Figure 4 Expected Water Levels in the Oldman Reservoir

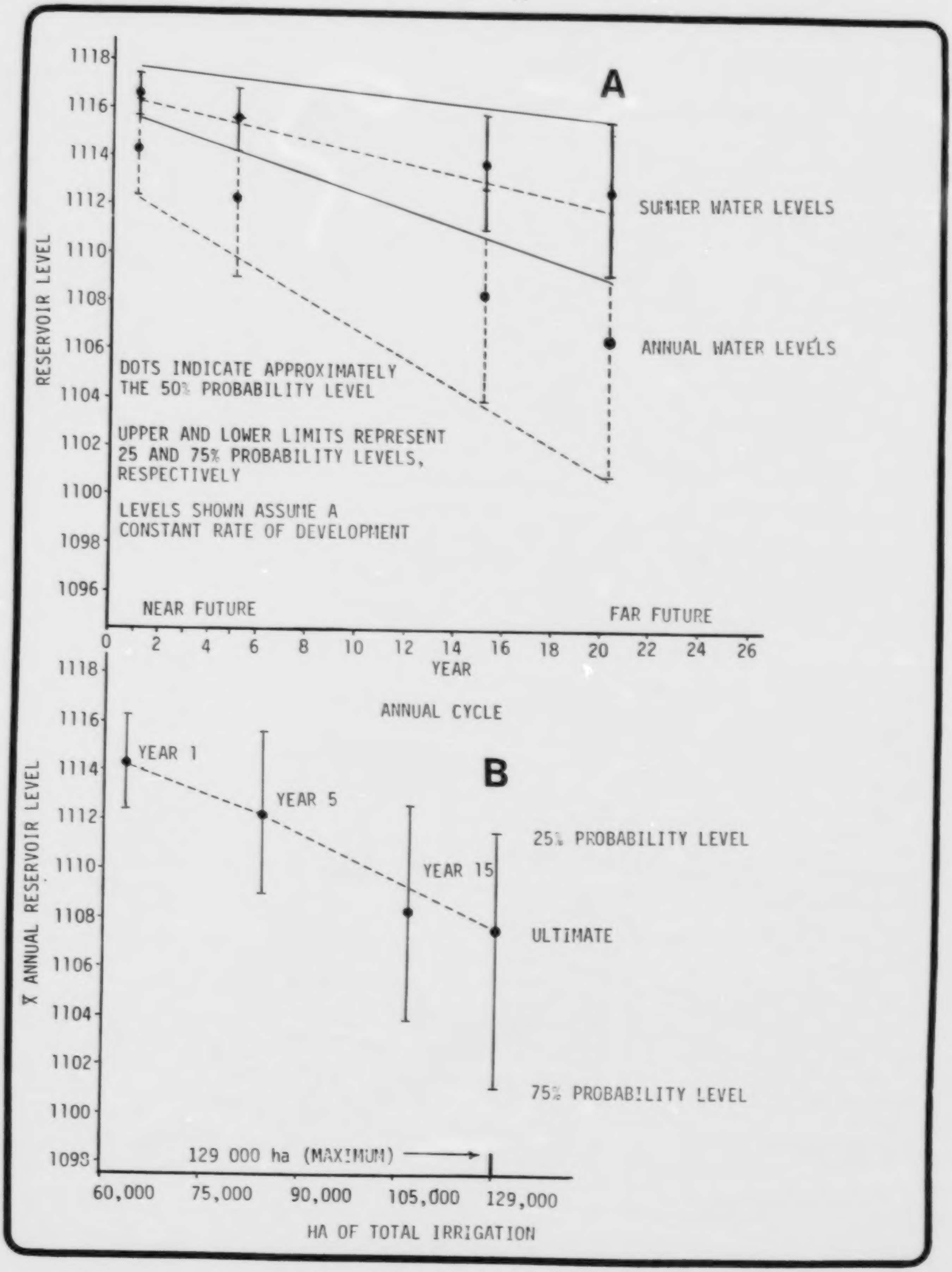

Figure 5 Relationship between Water Levels & Time (Potential)

following locations (Map 4):

1. Upper reaches of the Castle River;
2. Upper reaches of the Crowsnest River; and
3. North of the dam site.

These reservoir areas will be prone to exposure even with limited (less than 3 m) seasonal or annual water level reductions, since they have relatively level topography and occur elevationally just below the FSL. In total, these three areas represent approximately 300 hectares or 11 percent of the reservoir area. During lower water level periods (after ten to fifteen years), the average amount of exposed reservoir will increase to 700 hectares (25 percent). Increased exposure will primarily occur along the Castle, Crowsnest and upper portions of the Oldman Rivers (Map 4). As mean water levels continue to decline towards ultimate irrigation development, it is expected that the reservoir, during the summer months, will average only one-half to two-thirds of its FSL size. This does not mean that the reservoir will be consistently two-thirds of its original size, but rather that the size will fluctuate from full to less than half of its maximum size during the summer months. Such fluctuations will increase the difficulty of accessing the reservoir and render portions of it unusable for water oriented recreation.

Historically, monthly discharges in the Oldman River downstream from the proposed reservoir have had a cyclic annual pattern which peaked during late May and June (133 and 149 m^3/s), based on the Brocket recording station (Inland Waters Directorate 1985). In general, these discharges result in channel water depths which range from 30 to 100 cm (Fernet and Matkowski, 1986). Water depths during May, June and July could be above normal. (At this time, officials with the Alberta Government are unable to confirm flows until several variables have been set, as the adjustment is an evolutionary process. Flows will also continue to be adjusted, even after completion of the dam. Associated with this increased volume of flow could be increased flow velocities. Since water is not normally required for irrigation after mid-August, it may be possible to adjust flows to improve benefits for recreation activities during this time period.

2.2.4 Water Resource Characteristics

Water characteristics and reservoir morphometry are important considerations in developing and evaluating recreation plans. According to various studies (Marshall Macklin Monaghan, 1984, 1985; Alberta Environment, 1985), water quality has an important impact on the drawing power of a reservoir for day and extended users.

Considerable research and modelling has been undertaken for the Oldman Reservoir (HydroQual Consultants Inc., 1986), although the results are considered interim until the reservoir operating plan has been finalized. Based on this research and other data, the following physical water resource characteristics were determined:

Area at FSL	2768 ha	(6837 acres)[1]
Area at Minimum Pool	400 ha	(988 acres)[2]
Mean Depth	21 m	(69 feet)[3]
Maximum Depth	68 m	(223 feet)[4]
Fluctuations in Reservoir Levels		
- Annual	10 m	(31 feet)[5]
- Summer (May 1 to October 1)	9 m	(30 feet)[5]
Flushing Rate	0.38 year[6]	

As previously discussed, the drawdown of the reservoir during the summer period will significantly reduce the surface water area with increasing impact on recreation as additional land is irrigated (Figure 5b). This drawdown is most apparent along the Castle and Crowsnest Rivers and eventually in the upper reaches of the Oldman River (Map 4), where large areas of the reservoir bottom will be exposed (i.e., aggradational deltaic/fluvial deposits).

According to HydroQual Consultants Inc. (1986), reservoir water temperatures during the summer season are likely to be relatively cold in comparison to other central and southern Alberta reservoirs, and considerably colder than the more shallow lakes in southern Alberta.[7] It was felt that they would be 1° to 2°C colder than St. Mary or approximately 12°C (HydroQual Consultants Inc., 1986, p. 26), although specific temperatures were not developed for the 0 to 2 m for near shore areas. Further, the high winds experienced in the area will contribute to surface water turnover, cooling surface temperatures and reducing the positive impact that could be expected through daytime heating. According to the Red Cross Canadian Water Safety Program, the desirable temperature range for swimming in outdoor water bodies is 20 to 22°C.

Water withdrawals are expected to decrease water temperature in the Oldman River in the spring and summer as much as 4 to 6°C with the impact extending downstream as far as Fort McLeod. Because of the dispersed water contact recreation occurring in this corridor, it is not considered a significant factor in terms of numbers of individuals affected. In the Peigan Reserve, however, where there are a large number of families living close to the river, the river will be considerably cooler for swimming than it is now. In the fall, water releases are predicted to suppress ice development to the LNID weir with the result that it is expected to remain ice free until after mid-February and potentially open on a year round basis (dependent on winter conditions). This would result in greater sport fishing activity by local residents.

The reservoir itself will likely freeze over during the third to fourth weeks in November limiting further late fall fishing, but could remain open into early December. In the small ravines, Castle and Oldman, ice build-up may be expected a week earlier as a result of wind protection which would reduce boat access to the main body of the reservoir. Spring break-up is not expected to occur prior to the first week in May but will vary according to wind, severity of winter temperatures and inflow patterns. The ice surface may be sufficiently smooth in some years to support iceboat sailing. However, frequent winds may generate rough ice conditions and, therefore, eliminate this activity. No ice depth information was available, but based on other reservoirs in the region, it is anticipated that adequate depth will be available to support ice skating and fishing activities, although caution must be exercised in any travel on the ice.

In addition to temperature, there are other water quality parameters that influence the recreational desirability of the reservoir. Some of these include water clarity or turbidity, Chlorophyll "a" levels and microbiological criteria. HydroQual Consultants (1986) has predicted that the reservoir will be oligotrophic or potentially bordering on mesotrophic indicating low productivity for sport fishing; a summer Chlorophyll level of 5 ug/L is considered to be quite low (Ontario Ministry of Natural Resources, 1977).[8] From a water contact perspective, this would appear to be an advantage with only a small amount of suspended algae and high water clarity for water contact activities. Furthermore, it has been indicated that the typical upsurge in Chlorophyll "a" values during the first year of the reservoirs operation will likely be minimal and "primarily restricted to the first year after filling".

Preliminary investigations by HydroQual Consultants suggest that wave action will result in significant shoreline erosion during the summer season for several years.[9] Further, 91 percent of suspended solids are predicted to enter the reservoir during May and June to the early part of the summer recreation season which coincides with maximum wind speeds in April, May and June (HydroQual Consultants Inc., 1986). It is predicted that these suspended solids (high silt and clay content, 50 to 70 percent) will reduce water clarity up to the beginning of July along specific shoreline sections (predicted impact areas unavailable). Higher wind speeds in the fall will also increase erosion and reduce water clarity. Visual observations of shoreline erosion along Lake Diefenbaker, Saskatchewan, have indicated the presence of high shoreline turbidity extending into the reservoir for a distance of 50 to 75 m, significantly decreasing the quality of adjacent beach areas for recreation use. A similar pattern of shoreline turbidity may also be anticipated in selected areas for the Oldman Reservoir. The predicted range in turbidity during the summer season may be as low as 0.5 m and up to 2 to 3 m for a secchi disc reading. The importance of locating beaches in areas with clear water is therefore very apparent.[10]

Research to date indicates that nutrient input to the reservoir is low from the Oldman and Castle Rivers and is within the Alberta guidelines for fecal coliform which indicates that samples should not exceed 200 bacteria per 100 ml. As shown in Table 5, inflow readings for the Oldman and Castle Rivers are within the guidelines. However, in extreme instances, the Crowsnest River has high readings that reflect treated sewage loadings from the Municipality of Crowsnest. Discussions with Alberta Environment officials have concluded that additional

Table 5
Geometric Mean Total and Fecal Coliform Data for Main Tributary Rivers to Oldman Reservoir (1984–85)[a]

		Total Coliforms	Fecal Coliforms
Oldman River at Waldron's Corner	Mean	5.24	0.61
	Maximum	107.00	20.00
	Minimum	0.00	0.00
	No. Samples	21.00	21.00
Castle River at Mouth	Mean	4.46	1.05
	Maximum	105.00	100.00
	Minimum	0.00	0.00
	No. Samples	22.00	22.00
Crowsnest River at Mouth	Mean	79.43	4.07
	Maximum	2516.00	2400.00
	Minimum	0.00	0.00
	No. Samples	22.00	22.00

[a] Source: Data provided by Pollution Control Division, Alberta Environment.

investigation is required to determine whether this high count should be considered as a limiting factor in locating recreation areas in the upper reaches of the reservoir. HydroQual Consultants Inc. (1986) has suggested that in general, reservoir dilution and decay of total and fecal coliform will result in "no microbiological problems relative to recreational or water supply use of the facility".

A water quality concern of reservoirs for boating, wind surfing and to less extent swimming (assuming this activity occurs in developed/managed areas), is floating or semi-submerged matter. Clearing of trees in the areas to be flooded will reduce this problem, although some debris may be anticipated from woody vegetation washed into the reservoir.

2.2.5 Sport Fishing

Although access to the Oldman, Castle, and Crowsnest Rivers is limited to a few highway crossings, river fishing is a very popular activity for both locals and non-residents during the spring, summer and fall months. According to a recent study, cold water habitat occurs downstream through the reservoir site to the LNID headworks and is used for spawning, rearing and summer feeding by mountain whitefish (supports a "flourishing" population) and rearing of rainbow trout (Fernet and Matkowski, 1986). Cutthroat, bull, and brown trout are rarely found either within the section of the river to be inundated or downstream to the LNID weir. Mountain whitefish and rainbow trout are the primary sport fish within the project area.

As a regional recreation resource, this section of the Oldman River has been described as being of moderate importance (O'Neil et al., 1982), although this may be a somewhat optimistic description due to the lack of access (private land and the

Peigan Reserve occupy much of the shoreland). Throughout the study area there are approximately six sites with popular access points. Private land, however, limits movement of fishermen to the road allowance-bridge in many instances. For the reasons noted, the sports fishery can be described as being under-utilized.

What impacts will dam construction and subsequent operations have on both the reservoir and downstream fishery? Will the establishment of a major waterbody on the Oldman annually attract large numbers of fishing enthusiasts that previously did not sport fish in the region? Will it cause a reduction in sport fishing activity in the area?

Environmental Management Associates (Fernet and Matkowski, 1986) identified a number of potential impacts and mitigative procedures that could be initiated by Alberta Environment to enhance the fishery during construction and subsequent operation of the dam. They have also generated habitat preference curves for the downstream area in order to facilitate future development of recommended flow releases. The report did not in either a quantitative or qualitative manner predict the future attractiveness of sport fishing to various user groups with the dam in place. Further studies in 1986 are to address the future quality of the fishery. Some conclusions of note that do influence the recreation use are as follows:

1. Conventional fish passage facilities do not appear to be economically feasible due to the height of the structure and a lack of data to support this type of mitigation. However, if a fish ladder is constructed it could become a tourist attraction with strong interpretive potential.

2. The dam will block seasonal movement of fish if they occur, although mountain whitefish may "complete all life-history stages" on both sides of the reservoir.

3. A tail water population of rainbow trout may be established below the reservoir, increasing interest in fishing these waters.

4. Water temperatures below the dam will likely be warmer in the fall-winter creating an ice-free area for the hardy fisherman.

In previous investigations, R.L.&L. Environmental Services (O'Neil _et_ _al_., 1982) predicted that a reservoir in the Brocket area would generate recreation sports fishing of only "low to moderate significance without stocking". Should stocking be considered (rainbow, lake trout, walleye) the attractiveness of fishing would be significantly improved to the sportsman. At present, predictions regarding the productivity of the reservoir are not available. Until such time as this information is available, it will not be possible to assess the attractiveness of the reservoir for sport fishing activities.

The current public awareness of the Oldman River as an excellent stream fishing area will initially have a positive impact on attracting fishermen to utilize the area for both stream and lake fishing. In most instances in southern Alberta, the productivity of the sports fishery is the single greatest determinant of the overall recreational use of the reservoir.

2.2.6 Wildlife Resources

The Oldman, Castle and Crowsnest River valleys are important habitat for ungulates, avian species and herpeto fauna in an area dominated by cultivated crops and grassland. Flooding of the valley floor will substantially alter this important valley habitat with a number of notable changes occurring to the natural interpretive potential and hunting opportunities.

The reservoir is situated in an area having a high winter population of mule and white-tailed deer. Several recent studies (Westworth and Brusnyk, 1985; Allison and Russel, 1985) have indicated that there are an estimated 255 to 365 cervids wintering in the proposed reservoir area. Valley reaches above and below the reservoir are similarly important winter ranges. During the summer months, the deer population within the study area is expected to be somewhat lower, although the area supports a resident population.

From a recreation perspective, it is anticipated that this population of cervids will be quite visible from wayside observation points, in future campground developments, and along the reservoir shoreline to boaters and hikers. Inundation of the valley will immediately displace certain animals, potentially increasing the population density in the adjacent valley corridors. Shoreland areas developed for extensive and intensive recreation use will almost certainly be used as a corridor for their movement. In Elkwater townsite in Cypress Hills Provincial Park, deer and elk regularly occupy the grassed open space area in the campgrounds and cottage areas, and as such are an important interpretive feature to park visitors. Planting mixed coniferous and deciduous trees/shrubs in and around future recreation areas as wind breaks, etc., will assist in creating habitat for the cervids during the fall and winter seasons.

Observing the movements-activities of this wildlife could be an important attraction to visitors boating on the reservoir and staying in the campgrounds.

Below the dam, it is anticipated that some loss in cottonwoods over several years may occur due to altered instream discharge from the reservoir unless measures are taken to mitigate these losses. The treed cover and food resources in this area are an important habitat consideration for the cervids. The interpretive interest in this wildlife by canoeists and fishermen using these valley corridors may have a negative impact upon resident populations because of overcrowding. According to Horejsi et al. (1978), "there are no long-term mitigation measures that can be taken with respect to wildlife". In the first few years following initial flooding, wildlife interpretation could, due to displacement, increase as a result of higher animal densities.

A review of irrigation reservoirs with high annual water level fluctuations indicates that the shoreline is not capable of supporting a large furbearing population. Consequently, it is unlikely that there will be any significant interpretation potential, even with the development of a narrow fringe of herbaceous vegetation and willows.

In terms of bird populations, concern has been expressed regarding the potential loss of Canada geese nesting sites (Horejsi et al., 1978). This potential problem could be mitigated by the construction of island nesting sites that would have interpretive potential to short-term and extended stay visitors. Some improvement in duck-geese hunting may occur since the reservoir will likely be used as a staging area.

Construction of the reservoir may reduce raptor populations since fewer shoreline areas with high cliffs will occur. A loss in habitat for these species could result in a decrease in the wildlife interpretive potential of the area (Horejsi, et al., 1978).

It is unlikely that the interpretive potential of herptiles along the valley above or below the dam will affect the recreation potential of the reservoir.

2.2.7 Scenic Resources

This section deals with scenic resources that potentially influence the location of recreation sites and the quality of the visual experience from water and land perspectives. The appraisal of scenic resources is very much a subjective process but it is recognized by several authorities that there is a strong correlation between particular landscape characteristics and their appreciation by the public.

The proposed reservoir area was analyzed to identify and provide an assessment of viewing potential and impacts. It was found that there was a large variety of landscapes including panoramic (extensive views of the reservoir with a background of the Livingstone Range and Porcupine Hills); feature landscapes (dam or a shoreline cliff) as viewed from the water or land; enclosed landscapes (reservoir area surrounded by steep valley walls); and focal landscapes (the dam as viewed from the river). In Map 2, important visual characteristics are identified and may be used in the future planning and design of recreation areas, and in making general shoreland management decisions.

Oldman Reservoir will become an attractive recreation site within a ranching and farming area, with many scenic contrasts. As an expansive waterbody in this semi-arid landscape, the reservoir will have a high visual impact. Views of the reservoir from Highway 3 will be limited to the Castle River crossing. At highway speeds of 100 km/hour the cone of vision for the driver is approximately 40 to 45° with attention focused up to 600 m ahead. Based on the relative confinement of the reservoir at this point (50 to 75 m) it is unlikely that the water body will have a significant positive visual impact. In this instance, there will need to be strong highway signage associating the reservoir with campgrounds, food services, tourist information, etc., before the limited view of the reservoir will have any positive impact on attracting travellers. During very low water years, this landscape at Highway 3 could be characterized by exposed mud flats, potentially discouraging visitation at the main reservoir. Clearly, the scenic quality of the reservoir will vary considerably. When full in early summer, it will tend to enhance the landscape, but in late summer and fall when drawdown will be at its maximum, its scenic value will be diminished.

In Section 17, Tp. 7, Rg. 29, the dam, as viewed from the proposed road system, will be a dominant feature from the high surrounding upland to the east or west, as well as the river below. Proper road alignment will produce scenic panoramic views of the reservoir and Porcupine Hills to the north and a ribbon-like perspective of the Oldman to the south and south-east. Some large areas of shoreline mud flat may develop north of the dam, impacting on the visual quality of the area.

During construction, heavy machinery, increased human activity, and earthmoving operations will detract temporarily from the area's scenic value. After construction, the existence and operation of the project features would have a lasting effect on the scenery of the immediate area. The major visual elements will be the dam, spillway and dykes. Because of the combination of different scenic characteristics and management activities visible from this point, it is unlikely that a more appropriate viewpoint-interpretive site would occur on the reservoir.

Along the north side of the reservoir, the water body will not be clearly visible (at its closest point, the reservoir is 0.8 km away from the proposed east-west road), minimizing its potential or use as a scenic road to attract and hold the interest of tourists. Construction of a causeway in Section 29, Tp. 7, Rg. 29 would, however, increase the visual appeal of the reservoir to the motorist.[1]

The shoreline along this north-east arm has many irregularities with several large bays; these bays during drawdown, however, will become exposed reservoir bottom. The extent of drawdown with construction of a causeway has to date not been estimated by Alberta Environment.

Under high water conditions, the flooded valley corridor of the lower Oldman River will be quite attractive at the proposed highway crossing along the northern boundary of Section 34, Tp. 7, Rg. 1. Under low water conditions, the shoreline and valley slopes will in part be transformed into a scene of mud or dusty sand-silt valley flats. The proposed north-south reservoir crossing in Section 33, Tp. 7, Rg. 1 will provide a similar enclosed waterscape to the east and west. Under low water conditions, the fringe of sand-silt shorelands will provide a relatively large, distinctive and unattractive margin to the water body during parts of July, August and September when a large number of visitors would travel this corridor.

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[1] The construction of a causeway in Section 29, Tp. 7m Rg. 29 across the north-east corner of the reservoir was one of the options included in the proposed transportation alignment presented to the Public Open House in Pincher Creek on March 6, 1986. It has since been eliminated from consideration.

Viewed from the reservoir surface, the numerous drowned creeks under highwater conditions provide a combination of attractive detail, focal and enclosed landscapes of grassed steep-walled valley slopes. Further, the water-land interface is particularly sensitive to visual disruption (i.e., building construction, vehicles and to a lesser extent planted vegetation) due to the consistency in certain shoreline characteristics from foreground to horizon. The appearance (scale, colour, etc.) of future recreation sites and access points is therefore very important during both site selection and design stages.

Construction areas and borrow sites located outside the flooded area have only recently been identified (UMA Engineering, 1986) and their visual impact and potential for recreation uses is unknown. Consideration should be given to the visual sensitivity of the landscape in locating these activities and in recommending rehabilitation projects. This information should be ultimately included in future development plans.

Both upstream and downstream of the reservoir the scattered stands of native cottonwoods are an important visual feature of the valley corridors. This vegetation provides a strong visual contrast to the open and panoramic vistas of the upland and creates attractive colour changes through the different seasons.

2.2.8 Vectors

To date no investigations have been undertaken to provide information on vectors and related problems. While vector-carried diseases are not a major problem in the study area, the serious equine encephalitis, which can be transmitted by several species of mosquitoes, occurs in Manitoba. There have also been reported cases in Saskatchewan. Mosquitoes often interfere with outdoor activities of people and are a nuisance in recreation areas. Some persons even require medical attention as a result of these bites.

Potential increases in mosquitoes could result because of the reservoir, conveyance system, and increase in irrigated land. Strong wind conditions in the area may assist in minimizing the problem and some control measures could be instituted by the administering agency if vectors become a problem.

2.3 Overview of Study Area: Man-made Resource Characteristics

2.3.1 Land Use

The Oldman Reservoir study area is situated in an established ranching and dry land farming area of southwestern Alberta. Although the land uses are primarily agrarian in this large study area (34.5 km long and 29 km wide), there are a number of land uses that directly or indirectly influence the use of the reservoir and the immediate adjacent shorelands for recreational purposes (Map 2).

The primary study area includes those lands above FSL, extending away from the reservoir for one kilometre. The area represents approximately 40.4 percent of the total study area (8,761 ha or 33.8 mi^2) and is most important in the development of recreation sites, parks and related tourism facilities. Table 6 and Map 2 identify the existing uses within the zone.

Table 6

LAND USE ACTIVITIES – SPECIAL FEATURES[a,b]

A. Primary Study Area		
1. Community of Lundbreck	1	(west end of reservoir)
2. Building Sites	35	(possibly 2 or more near or below FSL)[a]
3. Recreation Areas (Public)	1	(Castle River Recreation Area)
4. Recreation Areas (Private)	1	(informal camping at Summerview bridge)
5. Cemetery	1	(north of Cowley)
6. Historic-Prehistoric Sites (number and location unknown)	–	(currently under investigation)
7. Municipal Pumping Station	1	(north of Cowley)
8. Radio Tower	1	(N.W. of Cowley)
9. Major Power Lines	2	(according to 1:50,000 map)
10. Railroad Line	1	(CPR crosses Castle River)
11. Major Road Systems		– Highway 3 (E-W)
		– Highway 6 (N-S)
		– Highway 22 (N-S)
		– Secondary Road 510
		– Secondary Road 785
		– Secondary Road 507
		– 3 unnamed secondary roads
		– numerous section line roads
12. Pipeline	1	(near Cowley)
B. Secondary Study Area		
1. Building Sites	70	
2. Recreation Areas[b]	1	(Lundbreck Falls Rec. Area)
3. Gravel Pits	9	
4. Railroad Lines	1	(Continuation of CPR)
5. Peigan Indian Reserve 147	–	(NE 1/4 Sec. 12, Tp. 7, Rg. 29, W4)

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[a] Final disposition of these building sites is unknown.

[b] Informal fishing-camping occurs at several bridge crossing sites (e.g. Summerview Bridge).

At the dam site, an operations area will be administered by Alberta Environment. These facilities will include the dam and related facilities such as the spillway channel, operations area and dykes. Use of much of the remaining land is equally divided between cropland and grassland. At the west end of the reservoir is the community of Lundbreck (60 ha). As noted in Table 6, there are a number of building sites that occupy areas with a high capability for development and are typically associated with shoreland areas having good road access. Conflict between future recreation uses-facilities and exiting farm and non-farm building sites is a potential concern.

The only publicly operated recreation development to be affected by the reservoir is the Castle River Recreation Area located on the old highway south of Highway 3. Although some continued use may be anticipated, particularly in May and June, because of its proximity to the reservoir, considerable improvement in facilities and site conditions may be warranted to support this use since it will become less attractive due to adjacent mud flats as the reservoir level recedes in early July. Considerable camping and associated land and water-based activities occur on a private parcel of land near the Pincher Station bridge. This site and the associated opportunities will be lost when the reservoir is filled.

There are three historical sites that are currently mapped and included in the primary study area: the Massacre Butte Historic Site north of Cowley, a historic Stoney Indian burial ground, and the Breckinridge Mines coal workings at Lundbreck. Completion of a detailed archaeological study, which is currently ongoing, will provide a comprehensive assessment of cultural resources and potential conflicts-opportunities in locating future recreation developments.

In the secondary study area, agricultural uses were approximately equally divided between grazing land and cropland. Much of the cropland occurs along the upper section of the Castle River with grazing as the dominant activity in the upper portions of the Crowsnest and Oldman Rivers.

Active gravel pits occur east of the Peigan Reserve (three) and west of Lundbreck (approximately four). These pits are associated with glacial outwash deposits that occur along major river valleys. West of the Oldman Reach is the Cowley airport which, at this time, is not considered a constraint or an opportunity. It is anticipated that the archaeological study will identify several sites of significance, further influencing to the use of the secondary study area for recreation purposes.

The Oldman River Valley downstream from Brocket to the LNID headworks is comprised of agricultural grazing land and residences of the Peigan Indian Reserve.

2.3.2 Access to Reservoir

The close location of Highway 3 to the reservoir will be a significant factor in the future of recreation in the study area. Further, the proposed road plan for the reservoir will provide direct access to the dam site at the east end and to the reservoir immediately north of the community of Cowley. Other additional roads will be required and/or upgraded to provide access to individual recreation areas. No roads are planned that would provide scenic view points of the reservoir. Whenever practical, roads should be located so as to minimize adverse visual effects.

No change in the location of public roads is anticipated either above or below the reservoir. Although not identified in the transportation route planning investigation, it would be desirable to have public vehicular access from the dam site to the river for fishing, picnicking and canoe access.

2.3.3 Pre-historic Resources

The project area has unusual cultural resource significance because of the presence of large numbers of archaeological and palaeontological resources of people that once occupied the same valleys and terraces needed today for agriculture and other purposes. In the surrounding area, internationally significant sites are being developed, such as Head-Smashed-In Buffalo Jump, which have helped to generate a public understanding of the events and processes of both pre-historic and early European cultural history in the area.

A number of reports are available on the project area although a final report on the implications of the Oldman dam is still in preparation. An investigation undertaken by Carbex Geological Services Ltd. (Jones, 1983) under contract with Alberta Environment examined the palaeontological resources of the area to be inundated. In 1982, Dr. P. Currie of the Tyrrell Museum discovered two dinosaurs in the study area. The results of these and other investigations indicate that the area contains very important historic and pre-historic material (above and below FSL) including plant, invertebrate and vertebrate fossils, as well as tools and other artifacts of evidence of occupation by Indian and Euroamericans. Because of the possible high density and value of these sites and the loss of cultural resource information which might otherwise be preserved for study by future generations, a mitigation program may be required by Alberta Culture which could result in the recovery and dissemination of information. This information could be stored (in part) and displayed in an interpretive centre at or near the reservoir.

2.4 Assessment of Land Capability - Suitability

In this section, consideration is given to the evaluation of the primary study area and associated shoreland zone in terms of natural hazards, opportunities for recreation activities-facilities, candidate areas for development, and the implications of reservoir level fluctuations on the candidate sites. Further, opportunities for campground development and related recreation activities were considered through the Peigan Reserve to Brocket. Finally, reservoir levels were identified that would maximize recreation benefits.

The physical characteristics of the shoreland terrain were initially assessed to determine their capability of supporting recreation development. Through an assessment of the biophysical units (Table 6), it was found that much of the shoreline zone was not capable of supporting any intensive recreational uses or facilities as a result of various problems, including steep and erodible slopes.

Those shoreland units identified as having moderate to high capability to support the preferred public and/or private activities (identified by Alberta Environment) were further evaluated in terms of pertinent offshore, foreshore and backshore characteristics. From this analysis, six candidate areas were identified based upon the interim operating plan for the reservoir. An important consideration in the assessment of these shoreland units was the requirement to identify relatively large areas with water access where it would be possible to maximize development to accommodate the major activities of camping, cottaging, picnicking, boat launching-parking, swimming, etc. Each site was assessed in terms of the impact of the proposed water fluctuations. Based upon the implications of alternative reservoir levels, acceptable to unacceptable ratings were developed concerning the impact to future public to private shoreline facilities-uses. An additional four sites were identified that had high recreation potential in the river valley between the proposed dam site and the LNID weir.

2.4.1 Shoreland and Offshore Development Constraints

Based on fluctuating reservoir levels, projected erosion areas and dam infrastructure constraints, we have attempted to locate and categorize landscape problems as they relate to potential recreation uses and development of the reservoir shorelands. This evaluation was primarily concerned with the identification of sites which lacked environmental constraints such as steep slopes, unstable topography and seasonal flooding that make them potentially unacceptable for recreation development. Consideration was also given to shoreline sections where erosion could create boating hazards as well as the armoured shoreline along the dykes and the dam. Areas with extensive exposed mud flats restricting lake access were also considered in the shoreland evaluation.

Four levels of potential shoreline development constraints are shown on Map 3 and are defined as follows:

High:	Sites with highest potential for development. These areas have at least a moderate resource capability with few, if any, constraints associated with development.

Moderate:	Moderate potential for development. Areas having at least a low resource capability. Constraints may be significant but proper planning and design may reduce their importance.
Low:	Low potential for development. Areas having at least a low resource capability, but have no direct access to reservoir.
Not Developable:	Shorelands not developable. These areas have several environmental limitations.

Four biophysical classification units (3F1, 3F2, 3F3 and 3G3) were assigned "high or moderate-high" environmental constraint ratings (Table 7). However, only 3F1 units, or ravines, will significantly limit potential shoreland development. This problem is most apparent in areas along the east and northeast shores of the reservoir. The remaining biophysical units are not a major consideration since they will be submerged in the reservoir area. In total, approximately 14 km or 66 percent of the total shoreline length was considered incapable of supporting intensive recreational activities. Areas rated as having "moderate" constraints were associated with seasonal flooding, fossil slumps (3F7 and 3F8), and steeply sloping topography (3L3 and 3M2). These areas comprised 6 km or 25 percent of the reservoir shoreline.

2.4.2 Cropland Capability

Much of the land in the primary and secondary areas is currently in some form of agricultural use (pasture, range land or tilled cropland). Because of their importance to the local economy, each ecosection was evaluated for its capability for grain

TABLE 7

SUMMARY OF CAPABILITY AND LAND USE CONSTRAINTS FOR VARIOUS ACTIVITIES

ECOSECTION	POTENTIAL ENVIRONMENTAL CONSTRAINTS	CAPABILITY RATINGS				
		AGRICULTURE	CAMPGROUNDS	PICNIC AREAS	TRAILS AND PATHS	BUILDS w/o BASEMENTS
3F1	M-H $\underline{2}$	NC $\underline{2}$	L $\underline{2}$	L $\underline{2}$,8	L $\underline{2}$	L $\underline{2}$
3F2	H $\underline{2}$,$\underline{3}$	NC $\underline{2}$,$\underline{3}$	NC $\underline{2}$	NC $\underline{2}$,$\underline{3}$	NC $\underline{2}$	NC $\underline{2}$,$\underline{3}$
3F3	H $\underline{2}$,$\underline{3}$	NC $\underline{2}$,$\underline{3}$	NC $\underline{2}$	NC $\underline{2}$,$\underline{3}$	NC 2	NC $\underline{2}$,$\underline{3}$
3F4	M 2,1	NC 1,2,4,5	L-NC 1,4,2	L-NC 1,4,2	L 1,4,2	NC $\underline{1}$,2,4,5
3F5	M 4	L 8	L-M 4	M 4,8	M-H 6	L-NC 4,1,5
3F6	M $\underline{4}$	NC 1,4,5,8	L $\underline{4}$,1,8	L-NC 4,1,6,8	M-L $\underline{1}$,4,6	NC $\underline{4}$,$\underline{1}$,$\underline{5}$
3F7	L-M 2,3	NC-L $\underline{2}$	L $\underline{2}$,8	L $\underline{2}$	M 2	L $\underline{2}$
3F8	M 2,3	NC-L $\underline{2}$	L $\underline{2}$,1,8	L $\underline{2}$	M 2	L $\underline{2}$
3G1	L-M 2	L-NC $\underline{2}$	L $\underline{2}$,8	L $\underline{2}$	M 2	L $\underline{2}$
3G2	L	M 2,8	H 2	H 2	H	H
3G3	H $\underline{3}$,2	NC $\underline{2}$,3,8	L $\underline{2}$	NC $\underline{2}$,$\underline{3}$	M-L $\underline{2}$,$\underline{3}$	L $\underline{3}$,$\underline{4}$
3G4	L	L 2,8	H	H 8	H 8	H
3L1	L	H	H 8	H 8	H 8	H
3L2	L	M 2	M 2,8	H-M 8,2	H 8	M-H 2
3L3	L-M 2	L-NC $\underline{2}$	L $\underline{2}$	L $\underline{2}$	M 2,8,6	L $\underline{2}$
3M1	L	M 8,6	H	M 2,6	H 6	H
3M2	L-M 2	NC $\underline{2}$	L $\underline{2}$	L $\underline{2}$,6	M-L 2,6	L-M $\underline{2}$

RATINGS

H - HIGH
M - MODERATE
L - LOW
NC - NOT CAPABLE

CONSTRAINT FACTORS

1. Soil Drainage and/or Wetness
2. Slopes
3. Unstability
4. Seasonal Flooding
5. Seasonal Water Table
6. Stoniness
7. Depth to Bedrock
8. Soil Surface Texture

Underscored factors indicate severe ratings otherwise a moderate rating.

farming based on criteria used by the Public Lands Division of Alberta Energy and Natural Resources (e.g., Strong, 1981, 1982; Nelson, 1983). Within the primary and secondary portions of the study area, moderate to high capability and land comprises one-half of the available 18,900 hectares. Grazing land occupies a similar amount of land.

2.4.3 Capability Assessment of the Reservoir and Adjacent Shorelands for Recreation Use

To assess the capability of land adjacent to the reservoir for recreation development, each ecosection was evaluated for establishment of campgrounds, picnic areas, trails and paths, and buildings on the basis of physical site conditions. Most 3G2, 3G4, 3L1, 3L2 and 3M1 units were considered physically capable of supporting a variety of developments (Table 7). Steep slopes, instability, and seasonal flooding were the common constraints associated with lands adjacent to the reservoir and rivers. Development of most upland sites was limited primarily by slope constraints.

The following are brief descriptions of the capability of selected recreation activities/land uses.

1. Campground - Cottage Development

Although extensive amounts of land may be physically capable of supporting general development in the upland areas (primary and secondary study areas), access from these areas to the reservoir is limited by steep slopes which surround its outer margins. Further, these upland sites are exposed to the direct effects of strong westerly winds, which is considered a major constraint. Only sites which occur in the river valley or behind slopes perpendicular to the main force of the wind will avoid its direct effects. Such wind protected sites most frequently occur within river valleys, either up or downstream, but not adjacent to the main reservoir.

Based on the limited number of attractive sites located close to the reservoir, it is reasonable to assume that there is at least 100 cottage lots that could be established on this water body in the locations identified in Section 2.4.5.

2. Picnicking - Open Space Activity Areas

Many of the protected and well treed picnic and open space areas found in the river valley will be lost through flooding, obviously precluding their use. Ecosections with potential are identified in Table 7 and Map 1. In all shoreland areas, it was found that considerable site development modifications will be a necessity, including grading, tree planting and in certain instances it will be desirable to construct a berm to minimize wind impact.

Through the river valleys above and below the reservoir, the capability to support this activity is much higher with natural treed vegetation adding to the aesthetic, shade and protection from prevailing winds. These riverside sites of 2 to 4 ha, however, are physically separated from the reservoir for water-contact recreation purposes.

3. Driving and Hiking

Land-based recreation activities of visitors to the reservoir will include such non-specific area activities as driving and hiking. In the case of driving, the proposed access roads to the reservoir have not been selected based on recreation objectives.

The absence of proposed roads near the north side of the reservoir suggest that scenic views of the water body apparently have not been used as a criteria in the route planning of the future road system. This matter, however, will be very important in the final alignment of roads entering the reservoir area, particularly from Highway 3. Above and below the reservoir, it is unlikely that there will be opportunities where driving for recreation will be the important experience. At the site planning stage of development, certain visual considerations may be applied for example, in the proposed development immediately below the dam.

Formal and non-formal hiking opportunities will exist from certain development nodes. The extent of these activities will be influenced by land ownership and the capability of the landscape. Coulees frequently dissect the shoreline providing a range of wildlife habitat for interpretation. The numerous breaks in the topographic relief provides hikers excellent panoramic views of the reservoir, surrounding mountains and boating activity on the reservoir. In the river valleys, hiking activity may be more confined due to private land ownership constraints whereas it is anticipated that some crown land will extend around much of the reservoir shoreland

4. Other Summer Oriented Land-Based Activities

The study area has some limitations to the establishment of activities such as horseback riding, walking for pleasure, golf and tennis. Horseback riding is both facility and land dependent. The strong westerly winds combined with the limited vegetative cover will impact upon the recreation experience. The availability of riding stock in the immediate area, however, may encourage the establishment of a riding concession.

Establishment of a golf course would require a large area 75 - 80 ha close to a major development node. Due to the high cost of development and maintenance of this type of facility, it is not considered feasible at this time.

The location of tennis courts is not considered resource dependent, except possibly where wind conditions are a major factor. Generally, these facilities could be established if considered an important land-based attraction by the respective operating agency or private sector (campground or resort).

The reservoir will provide opportunities for extensive walking areas-trail development for pleasure in the upland area retained by the reservoir operating authority as well as shoreline areas exposed as the water level recedes.

5. Swimming and Shoreline Water Activities

Swimming is one of the most important activities of recreationalists at lakes and reservoirs in Alberta (see Use Estimation Model 1). It appears that the reservoir will have fairly cold water temperatures well into the summer season; these cool temperatures are a result of many factors. At best, some daytime warming of the water will occur in gently sloping shoreline areas if these areas are appropriately designed (wet beach slopes of less than 10% and preferably less than 5%).

Natural sand beach development is not anticipated to any extent. Sand will need to be provided for both wet and dry beach areas to cover all exposed areas of each development site. Ideally, this should be undertaken when the offshore slope is re-contoured to accommodate swimming activities. Thus, the capacity of the reservoir beach areas are directly related to the size of the waterfronts constructed and bear little or no relationship to the establishment of natural beaches.

The existing swimming capability of the Oldman River below the reservoir will be impacted upon first, by the cooler water temperatures and second, the higher summer volume and velocity of the river creating an increased safety hazard. Consequently, it is reasonable to assume that some decrease in swimming activity may occur, especially during the period from mid-June to late July. Stream flow characteristics of the river through this area are currently being modelled by Alberta Environment and following their analysis will further assist in interpreting the impact on these uses.

6. Boating and Sport Fishing

Water skiing, boating for pleasure and angling are the predominant water-oriented motorized activities anticipated on the reservoir. It is understood (Alberta Environment) that the trees will be removed from the area to be inundated and that floating debris, logs submerged-partially submerged will not be a constraint to these activities. Wind and wave action will present some problems for boaters, however, it is expected that when one area of the reservoir has rough wave conditions, the opposite shoreline or some other more protected areas will be available for these activities. During low water years and when Scenarios 3 and 4 are put into operation, additional buoys and information will be needed to ensure safe boating conditions (Map 4).

Because of the wide fluctuation in water level anticipated and the narrow corridors of the Oldman and Castle, it is likely that some restrictions will be placed on the location of water skiing. In this regard, water skiing capacity calculations were based on this use being restricted to the main body of the reservoir and on the Castle River reach south to the CPR bridge, approximately 2.9 km up the Oldman reach, and to the northwest corner of the NE 1/4, Section 29, Tp. 7, Rg. 1. Based upon two extreme situations, water level at FSL and the 75% probability levels during Scenario 4 (medium levels), the instant water skiing capacity is estimated to range from a high of approximately 120 to a low of 70 boats as outlined in Table 8. It is likely that wind conditions for example may, however, reduce this capacity by 30 to 50% on a frequent basis.

Angling is anticipated to be a popular activity and it is estimated that the proportion of water skiing-power boating for pleasure and non-powered boats including angling on the reservoir will be approximately equal. Depending upon the productivity of the reservoir (investigations still ongoing, Alberta Environment) the reservoir will have a capacity to support between approximately 170 and 310 boats at any one time. Again, because of wind conditions, this number will also be reduced in the main body of the reservoir; during high water periods, however, the upper reaches of the main tributaries and the many inundations will significantly increase the available area to the anglers (probably in areas of reasonably calm water).

Some canoeing on the reservoir may be anticipated close to developed sites and along the Oldman and Castle reaches where there will be reduced wave action. Due to high winds, it will not be desirable to venture away from safe landing sites, especially for the novice.

Sailing may, with the establishment of suitable launch and marine sites, become an important recreation pursuit. The east end of the reservoir with large areas of water extending both north-south and east-west will provide good conditions for cruising and racing. In the short term it is anticipated that sailing will be

TABLE 8
BOATING CAPACITY CALCULATIONS

	FSL	Year 25 (75% Probability Level)
Total Water Area (ha)	2768	1900
Proportional Water Area (ha)[a]		
Fishing (skiing x 1.3)[b]	1860/2[c]	1030/2
Skiing	1430/2	790/2
Unskiable Water Area (ha)	1340	1110
Instant Boating Capacity (Number)		
Fishing	310 ± 155[d]	172 ± 43
Skiing	119 ± 30	66 ± 17
Capacity x 2.5		
Fishing	775 ± 388	430 ± 108
Skiing	298 ± 75	165 ± 43
Total Capacity	**1073 ± 463** or approx. 1070	**595 ± 151** or approx. 600

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[a] Calculation of area was based on the estimated total reservoir area at each level minus a 60 m shoreline band in undeveloped areas and a 120 m shoreline band in areas with public beaches, marinas, and public boat launch sites.

[b] The proportional area for fishing relative to skiing was increased due to the irregularity of the shoreline relative to most natural lakes.

[c] It was assumed that surface water activities were equally divided between fishing and skiing (Alberta Recreation and Parks, personal communication).

[d] Median equals to 3 ha/fishing boat ± 1 ha; 6 ha/ski boat ± 2 ha (National Park Service, 1980).

largely restricted to trailerable craft.

7. Wind Surfing

Wind surfing is an activity that has recently (since 1982) gained considerable popularity on lakes and reservoirs in Alberta as well as throughout Canada and the United States. Officials at Hood River, Oregon, an internationally recognized wind surfing centre indicated that strong and frequent winds during the high summer season were an essential requirement. Wind data for Pendleton, Oregon indicated that the mean monthly wind speeds average 15 km/hr for the months of May through August (Ruffner 1974) which compares favorably to the 17.5 km/hr experienced during the same period for the Oldman Reservoir (high wind speeds may reduce novice activity).

Other important environmental conditions identified included warm to hot temperatures (25 - 30°C) and water temperatures of 16-22°C. When these conditions are not available (e.g., intensive use areas such as Lake Ontario and Muskoka Lake district), participants will use a wet suit. Other considerations affecting the use of a water body for this activity are: the availability of a large grassed area adjacent to the launching area to rig-up; shallow off-shore zone for instruction; adjacent parking; concession to rent boards; and a racing program. To date no surface water area requirement data is available to estimate the capacity for wind surfing although it is felt that the requirements would be less restrictive than either water skiing or sport fishing.

Based upon the wind conditions experienced in the Pincher Creek area, the Hood River operators felt that this reservoir would attract considerable weekend use. It was also felt that the number of wind surfers to use the reservoir will, however, be strongly influenced by the quality of facilities provided, marketing and events scheduled through the summer.

8. Diving

Diving in the Oldman River with or without scuba gear is unlikely to become popular due to a lack of underwater scenery and turbid water conditions particularly in erosion prone areas. Cold temperatures will further discourage such activity.

9. Wildlife Observation, Culture Interpretation and Photography

The big game population will offer most interesting viewing and photographic opportunities for campers. In the fall, calm areas of the reservoir are likely to be associated with large flocks of ducks and geese.

The reservoir area, as well as new resources at the Head-Smashed-In Buffalo Jump, supports the continuing development of cultural interpretation facilities. The dam is a logical site to support an interpretive facility with good access to Highway 3, that would exhibit pre-historical to present day products and processes of man and landscape change. Depending on the facility and marketing, the centre could be an important visitor attraction and complement the marketing objectives of the Chinook Country Tourist Association.

10. Hunting

Hunting is a major outdoor recreation activity in the study area. It is anticipated that some increase in waterfowl hunting activity may occur in "field shoots" but due to lack of cover, be limited at the reservoir.

11. Ice Fishing

Ice fishing is a possibility on the reservoir during the late winter months. Ice conditions however, may be hazardous because of wind cracks, cracks from drawdown, and thin spots caused by currents. Further, additional information is required concerning the rate of fish harvest that the reservoir can maintain.

12. Snowshoeing, Cross-Country Skiing and Snowmobiling

These activities will be very restricted due to the lack of consistent snow cover and wind-swept conditions.

2.4.4 Capability Assessment of Riverine Areas for Recreation Use

Some of the best campground sites in the immediate area of the Oldman River occur in the river valley below the dam. The valley landscape provides the only natural protection from the prevailing winds. The primary disadvantage of development in these areas is the distance to the reservoir for swimming and boating activity. It is recognized that the valley sites will have high interpretive potential for viewing, photography, as well as good fishing and canoeing.

1. General Canoeing and Kayaking

According to Alberta Environment, the bridge site on the NW 1/4 of Section 9, Tp. 9, Rg. 1 is a popular canoe access point for launching canoes in the Oldman. During the high water periods, this will provide approximately 12.6 km of grade 2 canoeing prior to entering the reservoir. On the Crowsnest River some canoeing will continue above the falls at Lundbreck, although having to portage around the falls may encourage recreationalists on longer trips to start from below the dam. Shallow water and sand bars along the Castle River restrict this activity to the early spring runoff period when high water flows are experienced. It is likely that canoeing-kayaking on the Castle and Crowsnest in this area would be considered as a potential day use activity by campers staying at the reservoir, Lundbreck Falls Recreation Area, etc.

Below the dam to the LNID weir, the Oldman has been classified as a grade 1 river for canoeing with few obstructions in May and June. During July and August, under natural conditions, the volume of water is significantly lower, reducing stream velocity and depth. With increased flow required by downstream irrigation users, it is anticipated that the canoeing - kayaking potential of the river may increase. Data on projected downstream flow characteristics and water depths and velocities is currently unavailable for Scenarios 1 - 4.

Between Lundbreck and Lethbridge, there are a limited number of private and public campgrounds on the river. Many canoeists, however, prefer the attractive, more natural, undeveloped sites.

2.4.5 Candidate Recreation Areas

A key aspect of this investigation was the interpretation of shoreland areas having low to high recreation capability. Although many of the sites identified in Map 3 may be able to serve an important function in the provision of recreation opportunities on the reservoir, the high capability sites with permanent water access were considered critical to the future recreation development of the reservoir. The ability of these sites to support a diversity of extensive to intensive recreation activities in an attractive and interesting environment was therefore, an important criteria in the selection of candidate recreation sites (Map 5). Included also with sites ranked as having the highest potential are those areas which include a special feature of particular interest or of special recreational significance. Such features as the dam or a historic site may be very important attractions but very few sites in the surrounding area have the range of characteristics (without significant modification) to rank highly according to the capability assessment criteria initially utilized in the shoreland evaluation.

Analysis of the Oldman reservoir revealed that the shorelands of this reservoir have relatively limited resource capability compared with other natural or regulated water bodies. First, all sites with high recreation potential will require significant forestation and waterfront improvement before they would adequately meet public expectation and safety standards. A high recreation capability rating for shorelands at the Oldman Reservoir would probably be considered a moderate rating in other areas. Second, there are only a limited number of shoreland areas that have adequate size and capability to support development without major alterations.

Finally, the number of sites having recreation potential is further reduced by the strong winds and the cool water temperatures.

The following descriptions identify site characteristics, summarize the interpreted recreation value and the impacts of water fluctuations in terms of recreation activities gained or lost. This analysis provided the basis for the formulation of the recreation development opportunity concept alternatives as discussed in the Phase II report.

Candidate Area A - South-west Site

Characteristics:

- Maximum area 114 ha; potential conflict with existing farm residence, historic site and large gravel pit.
- 15 ha with moderate to high suitability (east end of site).
- Topography relatively flat (0 - 5% slope).
- Site utilized for cropland and grassland; major forestation requirement.
- Existing access roads.
- Adjacent land use is primarily agricultural field crops with little impact on recreation use.
- Wind exposure most significant environmental constraint.
- Difficult transition slopes to water (22 to 32 m vertical-45% slope).
- Good views of Porcupine Hills (north) and Livingstone Range (west).
- Area reasonably well drained, good substrate.
- Distance across reservoir at 75% probability level (Scenario 4) 350 m; maximum offshore water depths of 16 m with extensive areas 7 - 8 m.
- Large unsightly areas of exposed reservoir occur to the west when water recedes below 1108 m.
- A narrow zone of exposure occurs in a uniform pattern along site.
- At year 2010 this site will be located at the westerly limit of motor boat activity.

Interpreted Recreation Value: Active Development

- Site capable of supporting a number of activities-facilities including: day use, campground, cottage, overlook-interpretation.

- Boating access at east end (short life expectancy at west end).
- Redesign of waterfront area required for swimming and launching of wind surfboards.
- Significant expansion potential (with decreasing distance from beach-marina area).

Candidate Area B - South Central Site

Characteristics:

- Maximum developable area 20 ha - unit separated in half by slope.
- Adjacent land uses are pasture and tilled crops; requires forestation.
- Partially protected from west to south-west wind.
- Close proximity of development area to FSL (closest on reservoir).
- Surface conditions adequate to support a variety of developments.
- Potential to support water-oriented activities.
- No large zones of exposed unsightly reservoir bottom as a result of drawdown.
- Local water body at FSL 38 m deep; 28 m at 75% probability level.
- Width of reservoir at FSL 500 m; 75% - 28 m.
- Good view to north and east.
- No major erosion problems anticipated; moderate problem on opposite shoreline.
- Attractive boating areas to east and west.

Interpreted Recreation Value: Moderate to Active Development

- Developed camping - seasonal or short term.
- Day use - picnicking, playing field.
- Boat access including wind surfboards.
- Swimming - beach area.
- Private - public marina - food services concession.
- Limited cottage potential on upper terrace.

Candidate Area C - South-east Shore

Characteristics:

- Maximum 39.6 ha; potential conflict with two existing farm operations.
- Grassland and old road, will require forestation.
- Good existing access to Highway 3.
- Slopes (10 - 30%) along shoreline separating water surface and land development.
- Development site separated by former road bed.
- Good drainage; topography slopes toward reservoir.
- Good scenic view of reservoir (east and west) and north to Porcupine Hills.
- Reservoir 1,050 m wide and 46 m deep at 75% (year 2010).
- Strong westerly wind major environmental constraint.
- Potential boat launch and beach areas along road and ravine.

Interpretive Recreation Value: Active Development

- Developed campground - seasonal or short term.
- Day use - picnicking, open space, wind surfboard, launching/rigging up area.
- Public parking.
- Marina - boat launch area.

- Beach and adjacent open space.
- Commercial concession.

Candidate Area D - Dam and Dyke Overlook

Characteristics:

- 3 separate sites (east and west ends of dam and valley bottom below structure).
- Probable area of 10 ha required (below dam, sites may require development through landscaping due to significant disturbances during dam construction).
- Good water and dam views as well as the Oldman valley.
- River access for canoeing, fishing and picnicking below structure.
- Road access.
- Potential reservoir access for boats.

Interpreted Recreation Value: Moderate to Passive with Day Use Orientation

- Overlook/information/interpretation on or above dam.
- Picnicking-open space area with canoe access point on river.
- Hiking and interpretive trail system along valley bottom.
- Boat launch and parking area to reservoir.
- Picnicking-open space above reservoir (in association with boat lunch site).
- Limited developed campground - short term.

Candidate Area E - North-east Arm Site

Characteristics:

- Approximately 15 ha available for development.
- Pasture land; requires forestation.
- Easterly exposure for beach.
- Adjacent to proposed road.
- Drawdown characteristics and water quality (physical and chemical) unknown with construction of berm-road.
- Restricted boat access to reservoir.
- Maximum area for non-motorized power boating at FSL - 82 ha; 75% probability level - 29 ha (Scenario 4).
- Surface water width (FSL) 300 - 350 m at FSL; 150 m 75% probability level (Scenario 4).
- Potentially large unsightly exposed areas created with drawdown.
- Potentially good teaching area for wind surfing.
- Potentially warmer water than elsewhere in reservoir.

Interpreted Recreation Potential: Moderate to Active Development

- Day use beach, picnic and open space area.
- Teaching area for wind surfing.
- No motorized boating activity.

Candidate Area F - North Shore Site

Characteristics:

- Approximately 11 ha in area; used for grazing.
- Excellent road access to north.
- Good drainage and site conditions for development.
- Wind exposed from south and west.

- Long boat launch ramp required (west side).
- Scenic view of Livingstone Range to west and a small island in reservoir.
- Excellent access at FSL (east); shore slopes 22% along west section.

Interpreted Recreation Potential: Moderate Development

- Water access on north shore.
- Picnicking - campground site.
- Swimming beach - open space area.
- Institutional camp site.

Candidate Area G - West Brocket Site

Characteristics:

- Approximately 60 ha of treed river terrace.
- Currently in use as pasture land and as an access point to the river (canoeists/fishermen).
- Existing secondary road to site: 1.6 km to Highway 3.
- Cottonwood trees and valley walls provide shelter from prevailing winds.
- Potential inundation at flood stage.
- Good surface for development.
- Approximately 5 km distance to dam (assuming road along river valley).
- Water related activities limited to canoeing and fishing.
- Attractive setting (visual).

Interpreted Recreation Value: Moderate Development

- Developed campground (short term).
- Day use picnic site.
- River fishing area.
- Canoe access point on to river.

Candidate Area H - South-west Reserve Site

Characteristics

- Approximately 45 ha of semi-treed (cottonwood) river terrace.
- Current used for pasture and a single building.
- Potential inundation during flood stage.
- Access road required to Highway 3 (1.6 km).
- Surface good for development.
- Over 20 km of dam site to access reservoir (Highway 3).
- Wind protected by topography and vegetation.

Interpreted Recreation Value: Moderate Development

- Developed campground (short term).
- Sport fishing sites (day use/campers) on river.
- Canoe access point.
- Rodeo grounds/other Peigan cultural activities/special events.
- Riding/hiking (trails-areas identified by Reserve).

Candidate Area I - Central Reserve Site

Characteristics:

- Approximate area 31 ha of river terrace.
- Aesthetically attractive.
- Relatively flat and well treed (cottonwoods).
- Good access to river to launch canoes.
- Requires new road to connect with Highway 3 (5.6 km).
- Residence overlooking potential development (south).
- Remote from reservoir.

Interpreted Recreation Value: Moderate Development

- Developed campground (short term).
- Canoe access point.
- River fishing.

Candidate Area J - Eastern Reserve Site

Characteristics:

- Approximately 33 ha of river terrace.
- Close proximity to weir (interpretive value).
- Well protected from wind exposure.
- 2.8 km to Highway 3.
- Good access to river.

Interpreted Recreation Value: Moderate Development

- Developed campground - short term.
- Canoe access.
- River fishing.

2.4.6 Preferred Reservoir Levels and River Flow Characteristics

Maximum recreation potential of the Oldman Reservoir will occur during high water periods and become more restricted during low-water levels as the reservoir recedes during the irrigation season. The exposed shoreline may cause some public concern with exposed mud flats and potentially blowing dust. The large fluctuation will force recreation facilities to be located a considerable distance from the reservoir shoreline during the latter half of the summer. This will present several problems in gaining access to the reservoir shoreline due to the steep valley slopes and in constructing boat launch pads that will have to extend well below FSL. Facilities will also need to be located above the top of the flood control stage to prevent potential damage. Based on a variety of parameters including, exposed shoreline, effective boating area, effective beach area, related maintenance costs, and direct development implications to the candidate recreation areas, an analysis was undertaken of preferred reservoir levels for recreation use. Table 9 outlines various ranges of levels and their anticipated impacts to recreation uses.

TABLE 9

RESERVOIR LEVEL IMPACT ASSESSMENT

Reservoir Level	Preferred Reservoir Levels (May-Sept)	Comments/Implications[a]
FSL (1118.6)-1117.0 m	1. Ideal Range	1. Maximum boating area 2. Adequate dry-wet beach (32 m) 3. Minimum marina-boat launch constraints 4. High visual appeal (shoreline)
1116.9 to 1114.0 m	2. Low Impact Range	1. Decrease in useable water surface area in upper reaches of reservoir 2. Increase in shoreline fringe impacting upon boating 3. Increase in shoreline turbidity/erosion. 4. Increase in dry beach to 46 m - increase interpretive zone along reservoir edge.
1113.9 to 1110.0 m	3. Moderate to High Impact Range	1. Decrease in useable area (50 - 75 m) for boating around entire reservoir - islands and some boating constraints created on the Castle and Oldman Reaches (submerged/partially submerged islands) 2. Increase in visual impact (exposed shoreline as viewed from water) 3. Increase in turbidity/erosion (possibly comparable to No. 2). 4. Progressively higher costs to maintain dry beach 5. Long distance created between shoreline and maintained open space (86 m)

TABLE 9

RESERVOIR LEVEL IMPACT ASSESSMENT

Reservoir Level	Preferred Reservoir Levels (May-Sept)	Comments/Implications[a]
< 1110.0 m	4. High Impact to Unacceptable Range	1. Boating capability is limited to 60% of FSL capacity 2. High visual impact from shoreline - water discouraging use by residents/tourists 3. Significant separation between shoreline edge and open space. High costs to maintain dry beach 4. High loss anticipated in numbers of recreation users during this low water period

[a] Beach widths based upon a design grade of 10%.

3.0 RECREATION MARKET ASSESSMENT

3.1 Overview of Recreation-Tourism Objectives, Resources and Markets

3.1.1 Introduction

Several studies have been undertaken in the last fifteen years outlining regional and local community social and economic benefits to be derived from tourism and recreation in south-western Alberta. These studies documented user activities and identified new opportunities for the public and private sectors. All these reports consistently support the growing need for additional land and water-based activities-facilities in the Oldman Basin to serve both resident and non-resident markets. The initiation of the Canada-Alberta Tourism Agreement in the fall of 1985 has focused further attention on this industry by groups such as the Pincher Creek and District Economic Development Board.

Based upon regional research and planning studies and the wealth of data compiled on the use of "flow regulation" reservoirs for recreation in southern Alberta, it is anticipated that there will be significant local, regional and non-resident use of the proposed Oldman River Reservoir. A limited amount of provincial use may be anticipated, but this will depend to a large extent on the quality and marketing of facilities and activities established. This chapter describes the current development of tourist activity in this localized area within the Chinook Country Tourist Zone. Short and long-term trends in the development of the reservoir are identified, implications to existing recreation activities discussed and general implications on the local area identified wherever possible.

3.1.2 Existing Recreation-Tourism Markets

Chinook Country is the fourth most popular tourist destination area in Alberta behind Edmonton, Calgary and Banff. Recent statistics suggest that 39% of out of province visitors are from the United States, 25% are from British Columbia, 15% from Saskatchewan, 10% from Manitoba, 6% from Ontario, 1% from each of the Atlantic provinces, Yukon and Northwest Territories, and 3% of the tourist market is from international origins.

It is anticipated that over the next two to five years, Chinook Country may see a significant increase in visitors from the United States (MTB, 1984). This increase will consist of both travel-through visitors and destination visitors. This increase should be anticipated when evaluating the potential for the Oldman River Reservoir.

A profile of the type of visitors who travel to Pincher Creek and area, their characteristics, expectations and trip characteristics can be drawn from the results of the regional tourism studies (MTB, 1984; Travel Alberta, 1983) in conjunction with other recreation-tourism development projects.

Results from these investigations indicate that there are four general target markets to be considered for the new reservoir (Figure 6). The local market includes communities within an approximately one and one-half hour drive of the reservoir. The major communities within this zone include: Fort Macleod, Pincher Creek, Lethbridge, Cardston and Claresholm. The predominate activities within the local area will be day use and to a lesser extent, weekend (over-night) oriented. Provincial research has indicated that swimming, hiking, fishing and boating are the preferred recreation activities of the local market. Therefore, typical requirements of users in this category will be

Figure 6

TOURISM & RECREATION ACTIVITY/ MARKET OPPORTUNITY MATRIX

MARKET SEGMENTS AND RESOURCE OPPORTUNITIES

TOURISM/RECREATION OPPORTUNITY	LOCAL		REGIONAL		PROVINCIAL		NON-RESIDENT	
	MARKET	RESOURCE	MARKET	RESOURCE	MARKET	RESOURCE	MARKET	RESOURCE
WATER-BASED								
1. Power Boating	◓	◓	◓	◓	◓	○	△	△
2. Sailing	◓	◓	●	◓	◓	○	△	△
3. River Rafting/Canoeing	◓	○	●	○	◓	○	△	△
4. Swimming/Beach	●	○	●	△	○	△	○	△
5. River Fishing	●	●	●	●	●	◓	○	○
6. Flatwater Fishing	●	●	●	●	●	◓	○	○
7. Windsurfing	◓	●	●	●	●	●	◓	◓
LAND-BASED								
8. Destination Camping	○	○	●	○	●	△	△	△
9. Transient Camping	△	○	●	●	○	○	◓	○
10. Day Hiking	◓	△	◓	◓	◓	△	◓	△
11. Picnicking	◓	○	●	○	△	△	△	△
12. Cottaging	○	○	●	○	◓	△	○	△
13. Snowmobiling	○	△	◓	△	○	△	△	△
14. Horseback Riding	◓	○	◓	○	○	○	△	△
HISTORICAL/CULTURAL								
15. Historic Parks and Sites	◓	●	●	◓	◓	◓	◓	◓
16. Archaeological Sites	◓	●	●	●	◓	◓	◓	◓
LEISURE DEVELOPMENTS								
17. Touring Corridors (regional)	○	●	●	◓	●	◓	◓	◓
18. Marinas	●	○	●	○	△	△	△	○
19. Recreation Resort/Park	◓	●	◓	◓	●	○	○	△

MARKET OPPORTUNITIES

- ● Strong market generator - many people will travel for this purpose.
- ◓ Moderate generator - some people will travel for this purpose.
- ○ Weak generator - few people will travel for this purpose
- △ Poor generator - very few, if any, will travel for this purpose

RESOURCE OPPORTUNITIES

- ● Very few other opportunities of similar quality.
- ◓ Some other opportunities of similar and lower quality.
- ○ Some other opportunities of similar and higher quality.
- △ Many other opportunities of higher quality.

swimming beaches, boat launch facilities, wind surfing launch and teaching areas, concessions, washrooms, and picnic areas.

A regional market was identified based upon the distance users were prepared to drive for water-based recreation (MMMW Ltd., 1985). This market includes an area equivalent to a three hour drive from the reservoir site. According to Alberta Recreation and Parks, the most popular activities of visitors travelling into this tourist zone include: picnicking, camping, water-based activities, sightseeing and attending special events. In contrast to developed recreation sites on American reservoirs (Pueblo, Berryessa, Folsom), only a few programs or special events are offered in Alberta to draw large numbers of recreationalists for special weekend activities. The regional market generally consists of people who stay overnight (minimum of two nights), in local campgrounds, hotels or visiting friends and relatives in close proximity to the recreation site. Destination campers typically stay an average of three to five nights. Based upon the activities and interests of the regional market, this group would require campsites to accommodate recreation vehicles with varying degrees of service, washroom facilities, showers, swimming beach, wind surfing launch area, boating and marina facilities and concession operations. Dependent upon the target market being considered, the program for specific development nodes could be oriented toward the family, young adult, group users, etc., as examined in Phase II.

It is anticipated that day tripping from major centres such as Lethbridge and Calgary will increase with continued improvements to Highways 22 and 520 and the opening of the Head-Smashed-In Buffalo Jump International Historic Site. Growth will occur in the form of both packaged group tours as well as individual family units. Visiting interpretive facilities-sites will be a primary activity, as well as stopping at major recreation areas to sightsee or perhaps use the picnic areas, concessions or washroom facilities.

A smaller provincial destination market may be expected to develop involving both overnight and extended-stay visitation. A review of travel characteristics of other reservoirs in Southern Alberta suggests that with appropriate facilities, weather conditions, etc., the length of stay would also be from three to five days. A proportion of campers from the provincial market who would normally "pass-through" the area could now be expected to stop at the reservoir. These would be mainly Alberta residents with an open itinerary that would allow them to spend one or two nights at the reservoir. The types of facilities required would be similar to those for the destination camper.

A large and growing non-resident market may be anticipated because of the proximity of the reservoir to Highway 3. This is an important consideration for the camper and other pass-through traffic. Further, if appropriate interpretive facilities are established and marketed, the reservoir may attract large package bus tours (non-resident) and in-province tours (Wiebe Tours, etc.). According to MTB, several Calgary-based charter tours presently serve the region, all of which have an interest in expanding their operation. The completion of interpretive facilities at Head-Smashed-In Buffalo Jump, Frank Slide Interpretive Centre, Waterton Lakes National Park, recreation development in the Porcupine Hills, Fort Macleod, Fort Whoop-up, Sir Alexander Galt Museum in Lethbridge, and the Remington Collection in Cardston will create opportunities for several different circle-themed tour routes. Should Westcastle Ski Area development proceed, it will also draw increased visitation and awareness to the area on a year-round basis. Planning and market investigations are also underway by Alberta Tourism to increase the number of international-national tourists to the Waterton

Lakes area. This may also increase visitation to the Oldman Reservoir.

During the course of the investigation, questionnaires were completed and interviews were held with industry representatives, the Chinook Country Tourist Association and other interested parties from the local area (Appendix A). The consensus from the questionnaires was that the reservoir would likely attract large numbers of local users, however this would probably depend to a large extent on the quality of fishing, swimming conditions (temperature), and site conditions (design of site to minimize wind impact), all of which have yet to be confirmed in other component studies. Some individuals felt that the reservoir would be an attractive overnight stop-over for the large summer pass-through traffic. At present, the primary activities of non-residents to the area include visiting friends and relatives (33%), general vacation (49%) and personal business (7%). People in this group are mainly from British Columbia, the prairie provinces and the United States. As previously outlined, this market will consist primarily of visitors travelling through southern Alberta to other destinations who will stop for food, accommodation, gas and other leisure activities that require only a small amount of time (e.g., interpretive pavilions, handicraft shops, etc.). In 1978 (MTB) it was estimated that only 12% of the total traffic passing through the basin had a destination within the basin. Further origin-destination analysis of the traffic would be required to determine if this has changed significantly.

3.1.3 Existing Water-Based Recreation Opportunities in the Basin

Will the development of recreation and tourism facilities attract new recreation markets to the area? Are the existing water-based facilities in the area overused-underutilized? How will existing recreation activities-facilities be impacted by the reservoir?

As recently as April, 1985, an overview study was undertaken by Alberta Environment which documented existing recreation opportunities and facilities in the region surrounding the proposed reservoir. In terms of the water bodies, it is suggested that the area had "moderate to high capability", although this is thought to represent an optimistic viewpoint of the resource base. The Oldman, Castle and Crowsnest Rivers were ranked very high on a provincial scale in terms of sport fishing, extensive camping and canoeing. Capital development in the form of parks, boat launch areas and picnic sites in the area to be inundated is limited.

Essentially, lakes with public recreation facilities are located north and north-east of Pincher Creek (Chain Lakes, Park Lake and Travers Reservoir) and south, south-west, and south-east within a 110 km radius (Beauvais to Milk River Ridge Reservoir). Table 10 identifies the facilities located in the nearby provincial parks.

In previous investigations, it was found that the types of developments established on these water bodies would generally characterize the potential market opportunities at the Oldman Reservoir. According to officials of Alberta Recreation and Parks (D. Perraton), a close comparison in the type of recreation experiences offered at Traverse Reservoir may be drawn with the proposed Oldman Reservoir.

Table 11 shows that use levels in provincial parks have fluctuated since 1981. The number of camper nights at water-oriented parks throughout the entire southern part of the province dropped in 1984 and 1985. Parks officials considered this to be the result of deteriorating water conditions/levels caused by extensive periods of drought.

Table 10

Regional Provincial Parks

		BEAUVAIS LAKE PROVINCIAL PARK	CHAIN LAKES PROVINCIAL PARK	LITTLE BOW PROVINCIAL PARK	TABER PROVINCIAL PARK	PARK LAKE PROVINCIAL PARK
FACILITIES/OPPORTUNITIES	Number of Camping Sites	85	140	193	53	53
	Number of Picnic Tables	65	25	54		
	Fishing	●	●	●	●	●
	Swimming	●	●	●		●
	Boating	●	●	●	●	●
	Boat Launch	●	●	●	●	●
	Groceries			●		●
	Trailer Sewage Dump	●	●	●	●	
	Concession			●	●	●

Table 11

USE STATISTICS

	Year	BEAUVAIS LAKE PROVINCIAL PARK	CHAIN LAKE PROVINCIAL PARK	LITTLE BOW PROVINCIAL PARK	TABER PROVINCIAL PARK	PARK LAKE PROVINCIAL PARK
Individual Camping Nights	1981	6,690	14,801	31,866	8,654	12,609
	1982	19,719	17,510	37,383	8,246	11,088
	1983	17,738	12,625	31,949	9,494	12,244
	1984	16,405	13,559	33,360	10,701	10,634
	1985	13,955	9,428	17,181	7,653	9,822
% Camping of Total	1981	20	28	35	12	6
	1982	35	25	35	6	6
	1983	59	19	42	6	6
	1984	58	43	54	33	10
	1985	56	36	41	31	9
Average % Occupancy (Weekend)	1981	58	69	85	75	82
	1982	94	70	86	84	71
	1983	98	36	75	85	79
	1984	88	48	83	84	68
	1985	74	41	48	77	72
Total Day Use Days	1981	N/A	N/A	N/A	N/A	N/A
	1982	N/A	N/A	N/A	N/A	N/A
	1983	12,167	N/A	N/A	N/A	N/A
	1984	11,975	17,807	27,970	21,192	92,308
	1985	10,947	16,368	24,335	21,823	89,562
% Day Use of Total	1981	80	72	65	87	94
	1982	64	74	64	69	93
	1983	40	80	57	94	93
	1984	48	69	45	66	89
	1985	43	63	58	69	90
Total Visitation	1981	N/A	N/A	N/A	N/A	N/A
	1982	N/A	N/A	N/A	N/A	N/A
	1983	29,905	N/A	N/A	N/A	N/A
	1984	28,380	31,366	61,330	31,893	102,942
	1985	24,902	25,796	41,516	31,476	99,384
Permits Sold	1981	2,500	3,450	5,275	2,225	2,150
	1982	2,976	3,440	5,200	2,175	1,875
	1983	3,567	4,440	4,375	2,150	2,250
	1984	N/A	N/A	4,625	N/A	2,225
	1985	2,522	2,078	4,167	1,902	1,795

N.B. Alberta Recreation and Parks "Park Users Statistics Handbook" may have some inaccuracies due to changes in data tabulation and compilation. Some data has been removed from the above table to compare yearly figures more realistically.

The regional tourism study (MTB, 1983) found that there is a lack of water-based recreation opportunities in the zone. Creation of the Oldman River Reservoir will cause certain gains, losses and changes in the recreation-tourism potential of the valley corridors between Brocket and Lundbreck. In simple terms, these changes may be summarized as shown in Table 12.

Table 12

Implications of Reservoir on Recreation Activities

Potential Gains/ Benefits	Losses	Changes
- power boating	- river fishing[3]	- landscape character
- sailing	- river canoeing[4]	- scenic viewing: - water - shoreland (hiking) - driving (limited)
- wind surfing[1]	- ungulate hunting[5]	- capital development: - cottage areas - campgrounds
- swimming/beach activity[1]	- 3 canoe access points	- interpretive facilities
- ice fishing	- unofficial river picnic sites	- reservoir/river access points
- water fowl hunting	- canoeing adjacent to Castle River Recreation Area	- financial benefits[8]
- camping[2]	- downstream use of river for swimming[6]	
- reservoir fishing[3]	- private river-side camping area[7]	
- river fishing[3]		

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[1] Cold water in the reservoir and cool westerly winds may limit activity.

[2] Organized camping will increase and displace the extensive activity now occurring.

3 Implications of the reservoir on downstream fishing and reservoir productivity is not yet known (Alberta Environment).

4 A loss of 42.5 km of Grade 1 and 2 canoeing will occur, adequate flow will be maintained to support downstream canoeing through and below the LNID structure (exact stream conditions in terms of flow/depth characteristics as yet unconfirmed).

5 Some displacement of ungulates will occur.

6 Increased stream flow and colder water temperatures downstream of the dam will reduce the desirability of the river to support swimming. Detailed estimates of stream flow and temperatures are yet to be completed.

7 Private camping area at Section 24, Township 7, Range 30, W4M.

8 Some business benefits will be gained at the reservoir and surrounding communities. Certain increased costs may be anticipated by the land owners regarding fencing, etc. in managing their land.

3.2 Factors Affecting Recreation Activity On and Around the Reservoir

Prior to the preparation of alternative development opportunity concepts and determining the economic impacts which might be expected, it is important to identify those factors of particular importance in influencing the extent of future tourism-recreational activity. Based upon the types of recreation use occurring on various Alberta and U.S. Department of the Interior reservoirs, consideration must be given to factors such as aesthetics, access, provision of appropriate facilities, site development-landscaping, marketing program and water conditions. Because of the environmental constraints, it is probable that the consumptive or non-consumptive recreational activities which will occur at the reservoir will be minimal unless the constraints are considered in the implementation phase.

1. Aesthetics

Reservoirs at full storage level are generally visually attractive water bodies. However, during drawdown periods the shoreline can often lose much of its appeal. At the Oldman River Reservoir, the rapid and extensive drawdown in late July and August will result in large areas of exposed shoreland, valley bottom and erosion areas. The lack of treed areas will further heighten the sense of a barren shoreline. Recreation developments in the shoreland zone will need to be sensitively located in order to minimize visual impact from both the water and adjacent shorelands.

Assuming appropriate site planning practices are followed in facility development, the primary concern is therefore fluctuating reservoir levels. Based on the prime recreation season extending from early May to late September, every effort should be made to operate the reservoir in a manner that will minimize drawdowns and associated unsightly mud flats and deadheads. Discussions with Alberta Environment officials (L. Szojka, Lethbridge) indicated that this may be possible under normal climatic conditions once the summer agricultural demand is reduced.

Because of the extensive areas that will experience erosion, it is unlikely that a shoreline stabilization program will be initiated. This means that major slump areas will be visible and will generate, in some instances, unsightly zones of shoreline turbidity. These conditions are likely to be prevalent at the reservoir for many years and should be an important consideration in site planning.

2. Access

Proximity to inter-provincial highways has been identified in other recent studies as an important factor affecting mid-week recreational use. It is anticipated that the close proximity of Highway 3 to the dam site (4 km at the east end) will be a significant factor in attracting the non-resident pass-through market.

Access from Highway 22 to the reservoir will be quite important for southbound traffic from Calgary. The location and quality of a future east-west road between Highway 22, the dam site and other attractions such as Head-Smashed-In Buffalo Jump will be a significant catalyst in attracting the touring public (tour bus and automobile).

A review of other reservoir recreation sites has indicated the importance of well developed access sites for boating and vehicular parking areas. In the past, access points for canoeing and sport fishing have been very restricted due to the limited number of crossings and extensive private land bordering the three rivers. Canoeing potential on the Oldman River could be improved with the development of good access points below the control structure.

3. Provision of Facilities

Several studies have identified that the establishment of quality facilities has a marked impact on the number of visitor days an area receives. In the case of the Oldman River Reservoir, the extent and type of recreational facility development including campgrounds, picnic grounds, interpretive centres, marinas, etc., will strongly influence the amount and type of recreational activity (land and water-based) at the reservoir.

The effects of intervening opportunities is strong in south-western Alberta with the presence of high profile competing areas-facilities at Waterton and Banff National Parks, Kananaskis Country, and public and private recreation areas in British Columbia. However, beyond a certain level of facility development on reservoirs, visitation does not appear to increase without significant events programing. This threshold is related to the diversity, location and quality of facilities and their linkage from a marketing perspective with other regional attractions. Recognizing that the Oldman River Reservoir will have certain constraints for water and shoreland activities (i.e., wind and lack of trees), it is therefore especially important that the appropriate facilities and site planning considerations be undertaken for various specialty activities (e.g., wind surfing).

If the potential of the reservoir is to be realized in light of competing areas, user requirements and certain environmental disadvantages, significant capital investment in recreation development will be required in order to compete for the specific regional and provincial market sectors.

4. Site Development and Recreational Attractiveness

The reservoir is located in a very attractive setting at the edge of the Porcupine Hills and scenic Livingston Range. From both scenic and cultural perspectives, the reservoir is in a high interest or unique area of the province. Although the reservoir site has several positive features, the strong winds will be a major constraint in planning for most water and land-based activities. Local residents have indicated concern regarding water safety due to wind conditions and potentially blowing dust (sediment) along the fringes of the reservoir. All developments will need specially designed berms, appropriate site exposure and shelter belts at campgrounds, marinas, etc., to create attractive high intensity use areas. Without these and other related provisions to enhance use, it is unlikely that the recreation facilities developed on the reservoir will receive significant user interest.

5. Market and Program Development

The major factor that sets apart successful recreation areas is the programing and associated marketing. With a relatively short season, it is very important that special events be planned and promoted to attract local, regional and potentially provincial markets. This will be especially important in establishing the reservoir as a special venue for activities such as wind surfing.

At the present time there has been very little effort made to promote programing and marketing of special events at reservoirs in southern Alberta (although wind surfing events have been held at Chin Coulee Reservoir). Effective use of the Oldman River Reservoir, however, will require considerable advertising and promotion to increase awareness for both the non-resident (bus tours and family traffic) and Alberta residents. Special events (e.g., fishing derbies, wind surfing races, etc.) would be required to establish a positive profile for the reservoir and associated activities in addition to providing the user demand necessary to support concessions.

6. Water Conditions

Water levels and the physical-chemical conditions of the water are extremely important factors in attracting and maintaining high summer use levels. Provincial parks at several southern Alberta reservoirs have experienced a significant drop in use since 1983 due to an extreme drop in water levels and poor water quality. This has impacted upon boating opportunities and water contact activities. A review of irrigation reservoir user statistics in California, Colorado and to a lesser extent Saskatchewan, indicated that abnormal drawdowns leading to the exposure of large shoreland areas also resulted in a significant reduction in both camper and day use traffic in these locations.

Based on the projected long-term demand for water from the Oldman River Reservoir, the surface area will be significantly reduced during drought periods. Special design provisions such as proper slope development, berming and beach development should be initiated prior to filling the reservoir in an attempt to minimize the potential impact on visitation. Nevertheless, it is anticipated that during the height of the drawdown period, some reduction in use may occur. This should be closely examined before approving the development of commercial operations.

3.3 Recreation-Tourism Market Characteristics

Past and present characteristics of the target markets interested in Chinook Country have a direct bearing on visitation levels, seasonal distributions and the types of facilities and/or activities visitors would use at the proposed reservoir. The current market characteristics are reviewed in this section to provide insight into the anticipated changes in these characteristics during the next ten years.

3.3.1 Demographic Characteristics

Although demographic data is not available for specific target markets, it is available based on specific age groups visiting Alberta Parks from 1982 to 1984. Table 13 outlines data for the 1981 Alberta population distribution by age groups as well as the proportion in each age group category visiting Alberta's Parks.

The largest visitor groups to parks in Alberta are those in the 20 - 34 and 35 - 44 age categories. Furthermore, these groups may have children ranging in age from under 5 years to 14 years of age. Children in these age groups have a high visitation level to provincial parks.

According to the Alberta Bureau of Statistics, this province will experience a decrease in the 0 - 14 age group but a marked increase in the older population (ranging from 15 to over 65 years of age) over the next 30 years.

Tourist demographics for Chinook Country closely reflect provincial trends. Specifically, Chinook Country caters to the following visitor groups:

Average Household Party Size	2.0 persons	
Retired Couples	21%	
Older Couples	15%	
Younger Couples	15%	
Older Singles	5%	(Trend has suggested province-wide decrease in this group)
Young Bachelors	5%	

Table 13
Alberta Parks Visitor Demographics

Age Groups	1981 Proportion Alberta Population	1982 Proportion of Visitors to all Parks in Alberta	1982 Proporation of Visitors to Water-Based Parks in Alberta
< 5	8.4	11.0	11.5
5 - 9	7.8	13.3	12.0
10–14	8.0	12.2	14.3
15–19	9.6	8.4	8.5
20–34	31.3	21.7	21.5
35–44	11.6	14.7	14.6
45–54	9.1	7.9	8.8
55–64	6.9	6.3	5.9
>65	7.3	4.5	3.0

Source: Alberta Recreation and Parks, Park User Survey Data 1982-84

As these trends continue, tourist markets in general will change their structure. The travelling family will be of middle age with few children. This will result in a shift in the type of activities pursued; for example, a change away from strenuous and physical experiences to more passive activities such as natural-human history interpretation, sightseeing, R.V. camping and boating for pleasure. The apparent high potential of the reservoir for wind surfing may, however, reduce the impact of these regional and provincial trends in terms of visitors/market groups. Further, according to Parks officials (D. Perraton), most of the park market is "non-typical" and programs and facilities should not necessarily be directed at the modal market but rather at these specialty groups.

3.3.2 Socio-Economic Characteristics

Lifestyles of Alberta residents are rapidly changing and it is predicted by the year 2005 that approximately 82% of the population will be residing in high density urban areas (Alberta Housing and Public Works). In addition, it is estimated that at least 40% of this population will be living in apartments. Surveys by the Population Research Lab of the University of Alberta indicate that residents of these multi-family dwellings utilize parks and recreation facilities more frequently than residents of single family dwellings. Consequently, it may be anticipated that the growth rate of water-based and related activities on the reservoir may increase at a faster rate than the growth in the population.

The economy of Alberta has recently experienced a number of severe setbacks. In the past, disposable income as a percent of total income had been very high in the province, exceeding the national level. In 1984, Albertans enjoyed personal income and disposable income of approximately 6.1% and 3.8% respectively, greater than the national average (a drop of 3.1% and 6.9% respectively since 1980). Although data from Alberta Bureau of Statistics is unavailable for 1985 and the first half of 1986, the positive position of Albertans may have eroded even more. Thus, the implications of these provincial trends are conjecture at this point, but according to interviews with suppliers of recreation equipment (purchase and rental), a significant reduction in sales/rentals is occurring in certain areas. This is likely to impact upon both participation rates (especially overnight) in existing activities and the diversification into new activities (at the time of writing, wind surfing sales are remaining high).

The continued strong position of American currency against the Canadian dollar and the potential threat to tourists while travelling in Europe will continue to have a positive impact on the number of non-resident visitors to southern Alberta. Special events such as Expo '86 will have a short term impact on visitation in the region, but will have little or no impact on long term use at the reservoir. If appropriately marketed (potentially through the Chinook Country Tourist Association), the economic incentive argument may be used very effectively in attracting Americans to the existing and proposed recreation areas in the basin. As will be noted later in this chapter, the number of visitors entering Alberta from Montana has remained relatively constant over the past three years.

3.4 Trends in Recreation-Tourism Travel

3.4.1 Recreation Trends

In determining future recreation demand, it is important to develop a comprehensive understanding of the character of existing recreational use. An excellent source of information relative to projected future use at the proposed Oldman River Reservoir are the results of operation from the water-based provincial parks in the vicinity. The four parks considered comparable to the Oldman Reservoir (Little Bow, Beauvais Lake, Police Outpost and Chain Lakes) experienced an 8.3% decrease in permits sold during the period of 1976 to 1980. More recent figures, however, also show a drop in permits sold. These figures are attributed to a large extent to the deteriorating water conditions caused by an extended drought in the region and the general downturn in the economy. Visitation statistics are outlined for 1983 to 1985 in Table 11 for the four parks. The data shows a 19.8% decrease in permits sold from 1981 to 1985, as discussed previously in this chapter.

Further analysis of the four parks was undertaken, including monthly use as a percentage of total use, weekend and weekly camping and day use as a percentage of the total use, weekend and weekday camping, and day use and camping party size. The results were used to project recreation demands and user levels at the reservoir to the year 2005. For a complete examination of the analyses, refer to the "Use Estimation Model" described in Appendix B.

Visitation trends in terms of monthly attendance and campground occupancy levels were similar in all four parks. Day use and camping activities during the months of June, July and August are becoming more evenly distributed in relation to earlier data which indicated a distinct peak in visitation during July. Furthermore, use is extending into May and September, suggesting that recreationalists are seeking vacation time outside of the prime months.

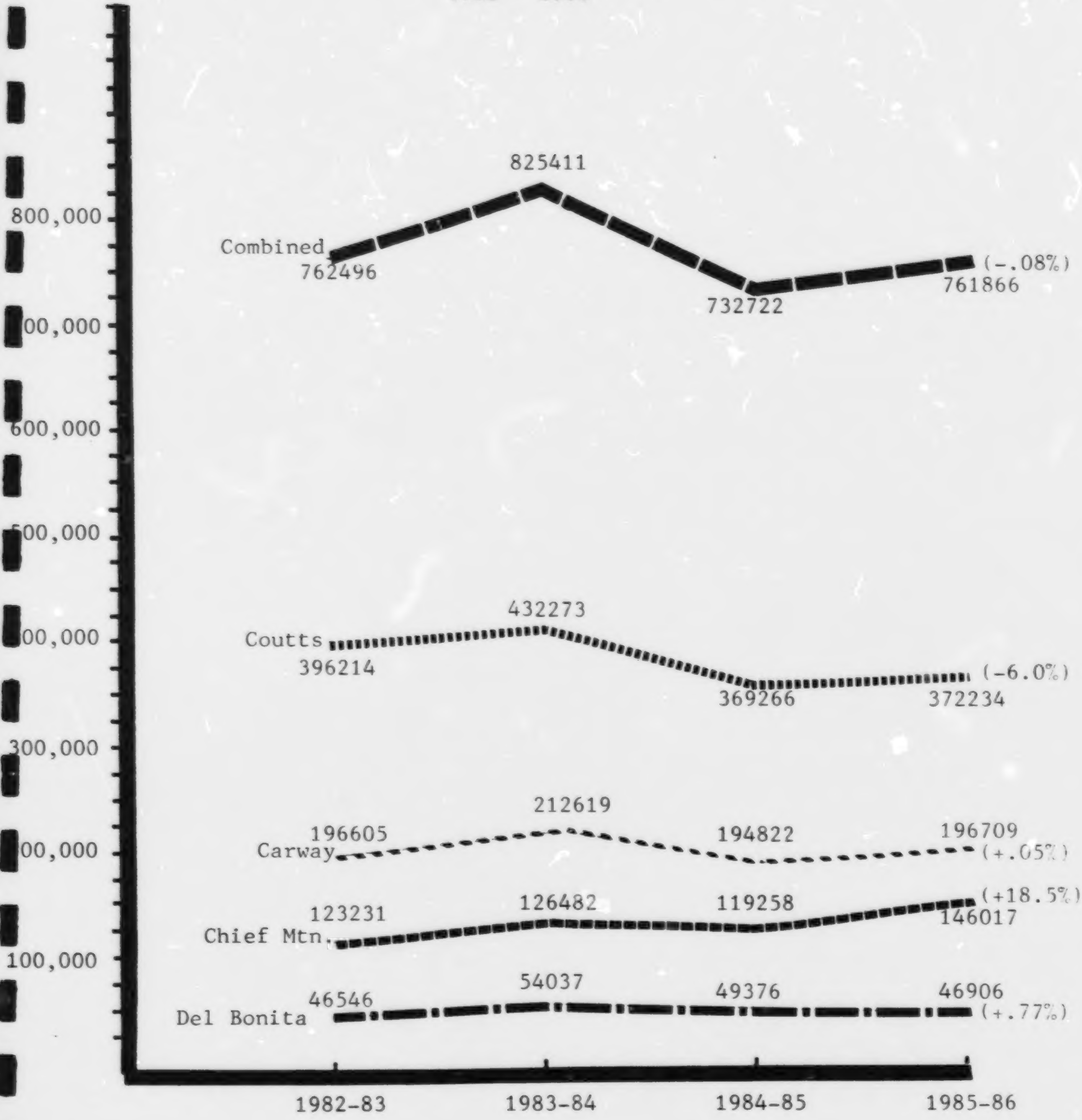
Over the period of 1980 to 1985, weekday, day use and camping activities have become more prevalent. Table 11 shows that the average weekend occupancy rates in the period of 1982 to 1985 has been reduced from 94% to 75%. Several reasons have been identified previously to explain this drop off in camping activity. The movement to weekday camping and day use is reflected province-wide with an increase of 25% experienced in 1985.

Recent observations show a decrease in the party size visiting each of the four parks. The most dramatic change has been reported at Little Bow Provincial Park where the average day user party decreased from 4.0 persons/party to 3.0 persons/party between 1981 and 1985 respectively. A similar trend was noticed in camping parties. These user trends may be largely due to the visitor demographics discussed in the market characteristics portion of this analysis. These figures represent on-site estimates developed by park field staff. Average party size as reported from more comprehensive park surveys is considered to be 5.0 - 6.0 persons/party. Further, no significant trends have been reported by Alberta Recreation and Parks (D. Perraton) regarding party size.

Through an analysis of the tourist market, a profile has been established to outline the recreation vehicles used for camping purposes in the study region. The latest statistics (1983) indicate that for the study region, based on an average of the four selected sample parks, truck camper equipment has been the most popular (44%). In order of importance, other camping equipment used was as follows: trailers (32%), tents (14%) and tent-trailers (10%).

Figure 7

COMPARATIVE ANALYSIS OF TOURISTS
ENTERING ALBERTA AT SELECTED PORTS OF ENTRY
1982 - 1986



Through discussions with those involved in the recreational vehicle market, it has been determined that a slow down in mid-range recreational vehicles is anticipated. However, an increase in trailer sales is anticipated by most segments of the sales market. Furthermore, indicators in the United States suggest that a 5% growth rate in trailer sales over the next two years is anticipated. This suggests that long and short-term site planning by anyone interested in developing recreational facilities at the Oldman Reservoir should be flexible enough to accommodate tent campers and trailer campers, as well as the fluctuating motorhome camping market segment (short-term and seasonal camping).

3.4.2 Tourism Trends

Tourism trends are influenced to a large extent by factors external to the local area and this is found to be particularly true for attractions that are not of a national-international scale. Indicators that may be examined in terms of the direction of the industry include: motel occupancy, the package tour industry and trends in the number of visitors entering Alberta from the United States.

Occupancy rates of motels in particular communities are not available, however in Chinook Country which includes the Oldman River Reservoir, there has been a net decrease in occupancy, reaching a low of 48.8% in 1984 (Travel Alberta). This represents a decrease in occupancy of 15.7% since 1978 and 11.5% since 1983. Statistics are currently unavailable for 1985 and 1986. Provincially, the occupancy rates have been fluctuating between 45% and 60% through the period 1980 to 1985, and this trend is expected to continue. Some increase, however, may be experienced in 1986 with east-west travel to Expo '86, but this situation is not likely to be reflected in 1987 and 1988 statistics.

A review of the origin of tourists using motels in the study area is as follows: Alberta - 55%, other provinces - 29%, United States - 13%, and foreign - 3%. A 9% increase in other provinces and a 1.2% increase in foreign visitors has been recorded since 1982. No change was found in United States rates and an approximate drop of 10% occurred in use by Alberta residents.

American travellers staying one or more nights was considered an excellent indication of American tourist trends into the area. According to estimates prepared by Canada Customs and Excise, there has been an 18% increase in passengers through Chief Mountain since 1982; this is the closest and most direct route to the reservoir. It is of interest to note that the number of vehicles increased only marginally (i.e., passengers per vehicle increased from 4.0 to 4.8 per vehicle).

An examination of data for all four Alberta border crossings between Highways 4 and 6, showed a mean drop in both the number of passengers and vehicles during the period between 1982 and 1986. The most noticeable decrease occurred at Coutts, possibly reflecting construction occurring on the Interstate Highway in south-western Montana. The most noticeable increase occurred at Chief Mountain, potentially reflecting the scenic attraction of Waterton and Glacier National Parks. A clear conclusion, however, may be drawn that any economic advantage to Americans travelling to southern Alberta to participate in water-based activities is being offset by the severe drought conditions experienced. Figure 2 provides a trend outline of tourists entering Alberta through the above mentioned points of entry.

The third indicator of tourist trends is the status of the tour bus market. As previously noted, the party size of visitors entering Alberta from the south is increasing, reflecting the growth of the tour bus market. It is estimated that as many as 325 tour buses pass the reservoir along Highway 3 annually. The packaged tour bus industry from both within and outside the province is expected to continue to increase for several years, reflecting the development of regional attractions in Chinook Country and the growing popularity of packaged tours.

As indicated in the above, no dramatic changes in tourism traffic have recently occurred in the region. Improvements in the American economy and water conditions in the southern reservoirs will potentially increase traffic in 1986. This is further supported by the continuing strong position of the U.S. dollar and special events such as Expo '86. It is anticipated that the packaged tour bus excursions from within Alberta, other provinces and the United States may reflect the strongest growth areas.

3.4.3 Highway Traffic Characteristics

Of the vehicles presently passing the reservoir site on Highway 3, a great majority are considered local traffic. However, during the summer recreation season of mid-May to mid-September, Highways 3 and 22 serve as major access corridors to Waterton Lakes National Park. These highways also provide access to and through the Crowsnest Pass area for visitors from origins north and east of the site. The high volumes of recreational traffic presently passing the reservoir site should generate a significant number of visitor days.

Alberta Transportation has conducted traffic counts along Highway 3 at various locations around Pincher Creek for several years. As a component of these counts, Alberta Transportation has developed estimates of the frequency of recreation vehicles passing by specific stations. Any vehicle either towing or carrying a recreational item, e.g., travel trailer, boat or pick-up camper constitutes a recreational vehicle.

Between 1979 and 1984, recreation vehicle traffic has increased an average of 3.9% annually, with variations over one to three years inclusive. According to these visitation levels, recreation vehicles account for an average of 18.8% of all traffic on Highway 3 during the period of 1979 to 1984. Therefore, during this period the recreational vehicle component of the total traffic ranged from, for example, 124 RVs/4110 vehicles (3%) in 1981 to 608 RVs/4140 vehicles (14.7%) in 1984. This range seems to be indicative of the traffic increases over the past several years on Highway 3 around Pincher Creek.

Recreation vehicle traffic sampled in the peak months of July and August indicates the highest levels for each of the twelve month periods, ranging from 376 RVs/4140 vehicles (9%) in summer 1981 to 528 RVs/4220 vehicles (12.5%) in summer 1984.

Summer traffic in the study region increases an average of 2-4% annually; the recreational vehicle component of those increases has been variable between decreases of 15-18% annually and increases of 30-75% annually.

3.5 Principle Target Markets in the Master Plan

Based upon trends in the Alberta and other non-resident tourism markets, key target groups were identified for existing and potential activities anticipated to be associated with the reservoir. To illustrate the demand-potential activity relationship, a matrix has been prepared (Table 14). Further, a summary is provided that identifies the activities expected to

Table 14

Visitor Participation

Activity	Participation[1]
Picnicking	69.9%
Swimming/Beach	76.4%
Water Skiing	24.2%
Power Boating	36.9%
Canoeing	15.0%
Sailing	9.4%
Fishing	51.8%
Camping	31.0%
Wind Surfing	20.0%

1) Interpretation is discussed in Section 3.8.

The above noted activities do not add to 100% because visitors participate in more than one activity over time.

The following facility requirements were established as a result of the Demand Day Load calculations and expressed demand by visitors to the tourist zone.

Table 15

Facility Requirements

	1985	1995	2005
Boating			
- launching	11 launch lanes	13 launch lanes	15 launch lanes
- trailer parking	385 parking spaces	455 parking spaces	525 parking spaces
- single car parking	38 single car spaces	45 single car spaces	52 single car spaces

	1985	1995	2005
Swimming			
- linear metres of beach front	385 m	441 m	495 m
Picnicking			
- picnic tables	97 tables	111 tables	124 tables
- parking 1.2 x tables	116 spaces	133 spaces	149 spaces
Parking (swimming & picnicking)	176 spaces	201 spaces	226 spaces
Campsites	81 sites	93 sites	104 sites

NOTE: The results shown may be rounded for planning purposes; the estimates merely represent the result of mathemative calculations.

demonstrate good to excellent growth potential. Conclusions drawn by the consulting team have been based upon a wide variety of data and selected interviews as there is little empirical data on the activities of specialty market groups.

The information provided is designed to highlight the specific opportunities which should be considered by government agencies, the private sector and the public in implementing the preferred plan.

The opportunities identified as having good to excellent growth potential include:

- river fishing
- flatwater fishing
- traveller camping
- historical parks/site interpretation
- archaeological display interpretation
- wind surfing
- historical auto touring
- destination recreation resort activities
- swimming/beach activities

Those opportunities that have fair growth potential include:

- power boating
- sailing
- picnicking
- river rafting/canoeing
- destination camping
- cottaging

At present, there are a number of unknowns with respect to such factors as the flatwater fishing potential in the reservoir, water quality as it related to swimming and beach activity and the ultimate quality of site development on the reservoir.

Within the local market area, camping and summer activity has dropped dramatically in recent years. However, it is anticipated that there will be a strong demand during the initial years of operation (e.g., Gleniffer Lake). The development of provincial-international interpretive attractions in the surrounding region will provide strong spin-off growth for this activity at, for example, the dam site.

The success of opportunities having fair growth potential will depend to a large extent on the initial major capital expenditures made by interested developers at the reservoir (e.g., marina/park development). Further, as previously noted, there is a softening in certain boat and camper sales/rentals. Also, the strong winds, combined with the abundant and attractive picnic sites in the area, reduce the potential demand for this activity. Cottaging has a limited potential (at least in the short-term) due largely to the lack of high quality sites.

3.6 Traditional Reservoir Recreation Use Estimates

To project use estimates to the year 2005 at the proposed Oldman Reservoir site, several inter-related analyses were undertaken. First, to establish a base use level, it was assumed that traditional recreation activities will represent the largest portion of total use at the Oldman River Reservoir. Using this assumption, it was possible to identify and estimate the size of those specific target markets which would constitute the recreation demand.

To assess the expected use of the reservoir, four model provincial parks were considered as indicators of the demand levels that could be anticipated for the region. These parks include: Chain Lakes, Beauvais, Police Outpost and Little Bow Provincial Parks. Although each park has specific characteristics affecting use, the lakes and associated park developments were selected because they all offer flat-water recreation opportunities considered traditional in nature.

To establish the origins of visitors to the reservoir, user statistics provided by Alberta Recreation and Parks were assessed. From this data it was found that four Alberta cities (Edmonton, Calgary, Lethbridge and Medicine Hat) account for 72% of the total visitation to the model parks.

Through several calculations, it was possible to establish an equation based upon the use levels, distance to the population centres and lake area for the four provincial parks. This equation allowed the study team to project use levels based upon increasing populations and travel statistics to the year 2005. Furthermore, through non-linear step-wise multiple regression, the logarithmic equation established optimal use levels specific to the proposed Oldman River Reservoir, relative to the lake area, population and distances from the major visitor origins. A complete description of this process is discussed in Appendix C-Recreation Use Estimation Model. To identify current use levels, one estimation is based on 1985 data; this will establish an estimation for development. Further projections to the year 2005 suggest expansion.

According to the model, some 11,800 "units" would have been attracted to the Oldman River Reservoir in 1985. Furthermore, the model predicts approximately 13,500 visitations in 1995 and 15,200 in 2005. These figures do not, however, identify the nature of the "unit." Therefore, further calculations were undertaken to characterize these "units" and provide a projection in terms of total recreation use-visitor days. In this regard, the study team estimated the portion of use that would be attributed to, for example, camping as a traditional recreational activity. In this case, it was found that 31% of those surveyed in the Chinook Country Tourist Zone expressed an interest in camping. Visitor levels were applied to the data and it was determined that 53,000 visitor days would have occurred at the reservoir in 1985. Projections in 1995 and 2005 established use levels of 60,700 and 68,100 visitor days respectively.

To further determine the actual facility requirements at the Oldman River Reservoir, the concept of Design Day Load was utilized. As outlined in Appendix B, annual visitation, proportion of annual use occurring in the peak month, the proportion of weekly use occurring on the weekend and the number of weekend days were used as components for the DDL equation. It was established that for the reservoirs in the region, 26.5% of the annual use occurs in one of the peak months of June, July or August. Furthermore, 45.8% of the weekly use occurs during the weekend. When the number of weekend days (8.5) was added to the equation, the DDL for each of the yearly projections was established. These figures provided an estimate of the optimum utilization anticipated for facilities at the Oldman River Reservoir. For 1985, 760 visitors represents the Demand Day Load and for years 1995 and 2005, the figures were projected to be 870 and 970 visitors respectively.

To identify specific facility requirements, calculations were based on tourist surveys from Chinook Country. The following visitor participation rates are based on the Alberta Recreation and Parks Public Opinion Survey (1984) data and discussions with representatives of the Pincher Creek and District Economic Development Board (1985), and estimations based upon recreation equipment sales.

To meet the needs of the transient visitor to the Oldman Reservoir, an assessment of travel statistics from Alberta Transportation (1985) was conducted to establish use levels of a "pass-through" nature. Additional calculations based upon the Average Summer Daily Traffic (ASDT) counts at strategic locations throughout the tourist zone and the average capture rates for parks of similar accessibility to the Oldman Reservoir provided the study team with data to project the growth in transient camper visitors to the year 2005.

Recent trends in ASDTs were utilized to predict ASDTs to 1995 and 2005. Furthermore, by utilizing park statistics, the average group size/vehicle was derived. Based on these values, estimates were developed in terms of individual visits to the park. It was projected that an additional ten sites in 1985 would have been required to meet the demands of the transient camper. Projections to 1995 and 2005 indicate an additional requirement of eleven and thirteen sites respectively. Therefore, the total estimated number of sites required to meet the demand is as follows:

1985	90 sites
1995	100 sites
2005	120 sites

3.7 Cottage Demand

The demand for cottage lots in this region of southern Alberta has largely come from the major urban centres of Lethbridge and Calgary, although some locally owned cottages are present. From discussions with real estate agents in Lethbridge and Pincher Creek, there are a limited number of existing developed sites, namely at Waterton, Beauvais and Lee Lakes. One of the most popular sites is that of Beauvais Lake which consists of approximately thirty cottages. Over the last five years, the Government of Alberta has been purchasing any lots that come available at Beauvais Lake to acquire land for more public-oriented developments (i.e., campsites, parks). Needless to say, there has been little available for the potential private cottage buyers. However, recently the provincial government has discontinued their buy-back program and once again individuals are able to purchase available cottages.

According to local agents, demand for cottage property is "fair". Vacant cottages typically remain on the market for approximately 90 days prior to sale. Over the last year, "one to two" cottages have become available at Beauvais. Furthermore, the same amount has come available at Waterton Lakes over the same period of time. Cottages at Waterton Lakes townsite are selling upwards of $90,000. This very high price reflects the demand for cottage property at Waterton Lakes but may not be characteristic of future lakeside cottage development outside the park. It is anticipated, according to real estate agents in Lethbridge and Pincher Creek, that cottage development at the Oldman River Reservoir would attract markets from both Lethbridge and Calgary with modest potential. Interest in cottage development by local land owners could also heighten interest. One limitation to this type of activity is considered to be the low interest in cottage development by residents in the region. Other factors involved include the number, quality and historic development of cottage properties in the Columbia Valley of British Columbia.

The attractiveness of the Oldman River Reservoir through landscaping and other on-site developments at a new cottage subdivision is considered very important in attracting private investment. A further consideration may be the ultimate drawdown characteristics of the reservoir and associated impacts on boating and beach shoreline aesthetics. It is suggested that, because of the nature of reservoirs, cottage development be considered after the reservoir shoreline has stabilized.

3.8 Tourism Related to Dam Construction and Operation

3.8.1 Visitation During Construction

Construction of the dam and associated developments of a recreation and non-recreation nature will help enhance interest in the project at both a regional and local level. Outside the region, awareness of the project will be limited, although a latent demand is anticipated from both tour bus and pass-through traffic markets, to visit this major water resource engineering project.

There is considerable difficulty in estimating tourist visits related to construction of the project since there are few examples of a similar project so close to a major inter-provincial highway. One example of visitors to a hydro project is Mica Dam in British Columbia where they received 10-12,000 visitors annually with 95% occurring during July and August.

Alberta Highways estimates that the summer daily two-way traffic will be approximately 4,130 vehicles by 1989. For the purposes of this analysis, we have assumed that these traffic levels will be maintained throughout the construction period. By applying known visitor to vehicle ratios for the Mica Dam project to Highway 3 traffic volumes, it is possible to estimate the anticipated summer visitation for interpretive purposes. Based on a capture rate of 0.25 to 0.3 visitors per vehicle, the project would generate about 64-77,000 visitors in July and August.

At the Mica Dam, it was found that the July-August visitation represented approximately 0.9 of the annual visitors per year. However, because of the close proximity of the Oldman River Dam to the highway, the more moderate climate found in the Pincher Creek area, and higher regional population, the figure of 0.9 could be adjusted to 0.75. Using these estimates, 80-96,000 visitors per year would therefore appear to be a realistic range to consider during the construction period.

3.8.2 Visitors to the Dam Site After Construction

Dams are popular centres of both tourist and local interest even after construction. This large water body will create a dramatic visual change for westbound travellers in particular.

In planning interpretive facilities adjacent to the dam, it is important to estimate the potential tourist traffic. A review of B.C. hydroelectric projects (e.g., Peace River and Revelstoke) indicates that the key variables affecting use by residents and tourists include: distance from the major inter-provincial highway corridors, recreation opportunities in close proximity to the reservoir such as a campsite, boat launch or special interpretive facilities. Visitation is also dependent on the extent of marketing undertaken encouraging visitors to the dam and recreation-interpretive facilities. Based upon an estimate of 0.15-0.2 visitors per vehicle, visitation by 1990 at the dam would reach 40-52,000, assuming that an appropriate interpretive centre was established and construction was complete (based on July and August).

3.8.3 Implications on Interpretive Facility Development

For the purposes of estimating recreation demand in this plan, it is assumed that a public parking area will be provided first during the construction phase and second, that appropriate parking and an associated visitor/interpretive centre will be operated during the summer months following the completion of construction activity.

Initially, parking will be an important consideration based on the relatively large numbers of visitors anticipated. Using the average daily summer rate of 2,500 visitors per day (1989), the parking lot would need to accommodate up to 100-120 cars, assuming that each party took 30 minutes to 45 minutes to view the construction site, each car contained an average of 2.2 occupants and that the viewing-interpretive area was open twelve hours per day (a four hour peak period would be equivalent to one and one-half times the average daily demand). Based upon these assumptions, 3200 m^2 would be required to accommodate these vehicles. It is unlikely that the demand for tour buses would significantly increase the parking requirement.

FOOTNOTES

1. Based on measurements from Alberta Environment Map (1:5,000) prepared by Western Photogrammetry Ltd. (1985) and Alberta Environment (1:50,000) base map. This value is approximately 15 percent greater than area-volume-elevation curves prepared by Prairie Farm Rehabilitation Administration (1976) and refined by UMA Engineering Ltd. (no date).

2. UMA Engineering Ltd. (no date) area-volume-elevation curve.

3. Prairie Farm Rehabilitation Administration (1976).

4. Western Photogrammetry Ltd. (1985) maps (1:5,000).

5. Based on estimate of water level probability (Alberta Environment, 1986) using 75 percent probability level (See Figure 4) during initial years of operation.

6. Alberta Environment (personal communication).

7. Data provided by Alberta Environment, Water Quality Branch indicated that the 1985 temperature profile for St. Mary Reservoir were as follows: depth 0-2 m (15.3-14.4°C) for May 23; depth 0-2 m (19.5 - 17.8°C) for July 3, and depth 0-2 m (16.9 - 15.8°C) for August 13, for readings taken in the centre of the reservoir.

8. According to the Vollenwieder Curve, a Chlorophyll "a" level of 4 ug/L would have a secci disc reading of approximately 2.5 m.

9. HydroQual Consultants Inc. (1986) indicates that there is approximately 9km of shoreline subject to substantial erosion. Further detailed studies of shoreline erosion are being undertaken by consultants retained by Alberta Environment.

10. Further investigation may be initiated by Alberta Environment to assess the implications of wind, currents and erosion on the location and drifting of water with a high sediment level. Implications of this analysis should be considered prior to detailed design work.

11. The Ontario Ministry of Natural Resources (1977) suggests that water used for body contact recreational activity is considered impaired when the coliform and fecal coliform exceed 1000 and 100/ml, respectively.

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Appendix A

PUBLIC OPINION SURVEY
Oldman Reservoir

Survey Results

Part I **Guidelines for Landowner's Submissions to the Recreation Component of the Oldman River Dam Project**

a) Questionnaire
b) Results Summary

Part II **Guidelines for Submission to Oldman River Reservoir Recreation Project**

a) Questionnaire
b) Service Club Results Summary
c) Youth Results Summary

Part III **Public Response – Opportunities/Concerns/Actions**

Part I

Guidelines for Landowner's Submissions to the Recreation Component of the Oldman River Dam Project

a) Questionnaire
b) Results Summary

Guidelines for Landowner Submissions to the Recreation Component of the Oldman River Dam Project

The following questions are presented as a guideline to assist you, as a landowner directly affected by the construction of the Oldman River Dam, to submit your personal comments concerning potential recreation/tourism opportunities of the proposed reservoir to the Municipal District Local Recreation Advisory Group. The attached map indicates the approximate boundaries of the proposed reservoir and the study area for the recreation component.

1. Where is your principal residence located (legal description)?

2. What is the present land use of your property?

( ) Agricultural
( ) Country Residential
( ) Other (specify) ______________

3. What are your long term (5 to 10 years) plans for your land?

4. What do you believe would be the most important summer recreational activity that you or your family would like to engage in on or adjacent to the reservoir?

( ) Fishing
( ) Swimming
( ) Sailing
( ) Windsurfing
( ) Walking/Hiking
( ) Beach Activity
( ) Other (please specify) ______________________________
( ) Row Boating
( ) Power Boating
( ) Water Skiing
( ) Picnicking
( ) Canoeing/Kayaking/Rafting
( ) General Relaxation

5. Which of these recreation activities would you consider the three most important? List in order of priority.

1) ______________________
2) ______________________
3) ______________________

... /2

6. What do you believe would be the most important winter recreational activities that you or your family would like to engage in on or adjacent to the reservoir?

( ) Ice Fishing
( ) Cross-Country Skiing
( ) Hunting
( ) Snowshoeing
( ) Ice Sailing
( ) Snowmobiling
( ) Ice Skating
( ) General Relaxation
( ) Other (please specify) ____________________

7. Which of these winter recreation activities would you consider the three most important? List in order of priority.

1) ____________________
2) ____________________
3) ____________________

8. Do you own a boat at the present time?

( ) YES ( ) NO

9. Are you likely to purchase a boat in the first three years of reservoir operation?

( ) YES ( ) NO

10. We are interested in your personal perceptions concerning major issues related to the recreational use of the proposed reservoir. Please indicate if the issues identified in the following list are, in your opinion, very important, important, or not important, with respect to your property.

Issues	**Very Important**	**Important**	**Not Important**	**No Opinion**
Noise Pollution				
. Auto Traffic	____	____	____	____
. Power Boats	____	____	____	____
. People	____	____	____	____
Air Quality				
. Increased dust from road traffic	____	____	____	____
Erosion				
. Loss of property through slumping	____	____	____	____

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Issues	Very Important	Important	Not Important	No Opinion
Water Supply				
. Access for stock watering	____	____	____	____
Land Use				
. Public Recreation Development (provincial or municipal parks)	____	____	____	____
. Commercial/Recreation Development (ramp, grounds, marinas, etc.)	____	____	____	____
. Seasonal Cottage Development	____	____	____	____
. Cottage Residential Development	____	____	____	____
. Separation of private/ public recreation areas and agricultural land	____	____	____	____
Reservoir Access				
. Landowner access to reservoir	____	____	____	____
Reservoir Levels				
. Implications to livestock/recreation	____	____	____	____
Water Quality				
. Nutrient pollution from agricultural activities	____	____	____	____
Public Safety				
. Hazards to immediate family	____	____	____	____
People				
. Trespassing on private property	____	____	____	____
. Vandalism	____	____	____	____
. Other (please specify) ____________	____	____	____	____

... /4

Additional comments or clarification of any of the above issues.

11. Would you favor the development of a recreation site or facility next to your property?

WHY? ______________________________

WHY NOT? ______________________________

12. What level of development would you prefer?

13. Would you favor public (provincial/municipal) or private (individual/organization) recreation development at the reservoir (or both)?

WHY? ______________________________

WHY NOT? ______________________________

14. Do you think you might be interested in investing, developing and managing or operating a recreation or tourism facility on the reservoir?

15. Please use the space below for any additional comments or suggestions you may want to make.

Landowner Submissions Questionnaire Results
Oldman River Dam Project

1. Principal Residence

Those landowners who reside on property directly adjacent to the proposed site are strongly opposed to any development. Furthermore, these landowners indicate very important to important levels of concern regarding major issues, as outlined in Question 10 of the survey. Of the total responses, 72.2% are opposed to any type of development on the reservoir. These responses largely represent the attitudes of landowners in close proximity to the proposed site.

Landowners indicating that they are in favor of development reside a greater distance from the proposed site and are not situated on major roadways. Primarily, those in favor of development are located either up or down stream on any one of the three rivers. In addition, those landowners in favor of development are situated back from the shoreline of the proposed site a significant distance of about 1 - 3 sections. Also, some of those with a positive response towards development are located in the Town of Pincher Creek; these respondents view the site as a chance for more accessible recreation opportunities and economic development, whereas those landowners close to the site view any development as a waste of money, time and a nuisance.

2. Present Land Use (respondents)

Agricultural	85%
Country Residential	15%
	100%

3. Long Term (5 to 10 years) Landuse Plans

Agricultural	59.0%
Subdivision	4.5%
Recreation	4.5%
Rent or Sell	9.0%
Build on Site	4.5%
Country Residential	13.6%
Damsite	4.5%
	99.6%

4. Most Preferred Summer Recreation Activity

Fishing	15.2%
Picnicking	15.2%
Swimming	11.8%
Walking/Hiking	11.8%
Water Skiing	10.1%
Power Boating	8.4%
Canoeing/Kayaking/Rafting	8.4%
General Relaxation	8.4%
Beach Activity	6.7%
Wind Surfing	3.3%
	99.3%

5. Priority of Recreation Activities (Summer)

	1st	2nd	3rd	Total Significant Importance
Fishing	9.8%	6.8%	6.8%	22.6%
Swimming	2.3%	6.8%	2.3%	11.4%
Walking/Hiking	---	6.8%	4.5%	11.3%
Beach Activity	---	4.5%	4.5%	9.0%
Boating	2.2%	4.5%	4.5%	11.2%
Water Skiing	4.5%	---	2.2%	6.7%
Picnicking	4.5%	4.5%	6.8%	15.8%
Canoeing/Kayaking/Rafting	2.2%	---	---	2.2%
Relaxation	6.8%	---	2.2%	9.0%
				99.2%

6. Most Preferred Winter Activity

Cross Country Skiing	18.4%
Ice Fishing	15.7%
Snowmobiling	15.7%
Ice Skating	13.2%
Ice Sailing	13.2%
Relaxation	10.5%
Hunting	7.8%
Snowshoeing	5.2%
	99.7%

7. Priority of Recreation Activities (Winter)

	1st	2nd	3rd	Total Significant Importance
Ice Fishing	16.6%	5.5%	---	22.1%
Cross Country Skiing	8.3%	5.5%	5.5%	19.3%
Hunting	5.5%	2.7%	---	8.2%
Snowshoeing	---	---	2.7%	2.7%
Ice Sailing	2.7%	---	2.7%	5.4%
Snowmobiling	2.7%	5.5%	2.7%	10.9%
Ice Skating	2.7%	8.3%	2.7%	13.7%
Relaxation	2.7%	5.5%	5.5%	13.7%
				96.0%

8. Boat Ownership (present)

Yes	33.3%
No	66.6%
	99.9%

9. Will you purchase a boat in the first three years of reservoir operation?

Yes	41.4%
No	58.8%
	100.2%

10. Major Issues - Personal Perceptions

Issues	Very Important	Important	Not Important	No Opinion
Noise Pollution				
. Auto Traffic	3.1%	1.8%	0.9%	----
. Power Boats	1.5%	1.8%	2.5%	----
. People	3.1%	1.2%	1.5%	----
Air Quality				
. Increased dust from road traffic	3.1%	1.2%	1.2%	----
Erosion				
. Loss of property through slumping	3.8%	0.6%	0.9%	0.3%
Water Supply				
. Access for stock watering	3.8%	1.2%	0.6%	0.3%
Land Use				
. Public Recreation Development (provincial or municipal parks)	2.5%	1.5%	1.5%	----
. Commercial/Recreation Development (ramp, grounds, marinas, etc.)	1.8%	1.5%	2.5%	----
. Seasonal Cottage Development	1.2%	0.9%	2.8%	0.6%
. Cottage Residential Development	1.2%	0.6%	3.1%	0.6%
. Separation of private/ public recreation areas and agricultural land	3.8%	1.5%	0.6%	----
Reservoir Access				
. Landowner access to reservoir	4.4%	0.9%	0.3%	----
Reservoir Levels				
. Implications to livestock/recreation	3.8%	2.2%	----	----
Water Quality				
. Nutrient pollution from agricultural activities	1.8%	1.8%	1.8%	0.3%

Issues	Very Important	Important	Not Important	No Opinion
Public Safety				
. Hazards to immediate family	3.1%	0.6%	1.2%	0.3%
People				
. Trespassing on private property	3.1%	0.6%	1.2%	0.3%
. Vandalism	5.3%	0.3%	0.3%	----
. Other (please specify)				
________________	_____	_____	_____	_____

Summary of "Very Important" Ranking

Ranking	Issue	Very Important
1	Vandalism	5.3%
2	Trespassing	4.7%
3	Landowner Access to Reservoir	4.4%
4	Separation of Land	3.8%
5	Access for Stock Watering	3.8%
6	Loss of Property through Slumping	3.8%
7	Implications to Livestock/Recreation	3.8%
8	Noise Pollution: Auto	3.1%
	People	3.1%

Note: Major concerns are clearly those of vandalism and trespassing.

12. Level of Development

None	35.2%
Small Park	35.2%
Cottage Development	5.8%
Beach Development	5.8%
Picnic Area	5.8%
Marina Development	5.8%
Major Facility Development	5.8%
	99.4%

13. Public vs. Private Recreation Development

Public	63.6%
Private	18.1%
Both	18.1%
	99.8%

14. Interest in Developing, Managing or Operating Facility at Reservoir

No	82.3%
Yes	11.7%
Maybe	5.8%
	99.8%

Part II

Guidelines for Submission to
Oldman River Reservoir Recreation Project

a) Questionnaire
b) Service Club Results Summary
c) Youth Results Summary

Guidelines for Submissions to Oldman River Reservoir Recreation Project

The following questions are presented as a guideline only to assist you or your organization in preparing a submission to the Municipal District Local Recreation Advisory Group regarding potential recreation/tourism opportunities on the proposed Oldman River Dam Reservoir. The attached map indicates the approximate boundaries of the proposed reservoir and the recreation study area.

CULTURAL / HERITAGE / HISTORIC / NATIVE PEOPLE / YOUTH / COMMUNITY

1. What are your views concerning the potential for the proposed reservoir as a recreation and tourism resource?

2. What are your views regarding the possible development and promotion of the cultural and historic resources in the reservoir area for tourist attractions (highway or destination attractions)?

3. Do you think that specific themes, scenic areas, sites, buildings or events should be considered in developing cultural/historical components of the reservoir?

4. Do you have any suggestions as to how quickly recreation or tourism facilities should be developed and/or phased-in at the reservoir, and who should be responsible for developing these opportunities?

5. Would your organization be interested in developing, operating or managing any lands and/or business opportunities associated with the reservoir?

6. Do you have any additional comments or concerns not covered by the above topics?

Guidelines for Submissions
Service Club Questionnaire Results
Oldman River Dam Project

Types of Development Identified

Hiking
Riding Trails
Fishing
Swimming
Boating
Campsites
Designated Cottage Area
Shelterbelts
Waterskiing
Wind Surfing
Sailing
Canoeing
Boat Ramps
Washroom Facilities
Laundry Facilities
Tobboggan Runs
Skidoo Trails
Confectionary
Skating
Development of Historical Displays
Green Space or Park Areas

Concerns Identified

1. Wind
2. Roads
3. Landscaping
4. Sewage Disposal
5. Garbage Disposal
6. Protection of Private Property
7. Water Level
8. Safety
9. Public Attitudes and Concerns are Considered in Planning
10. Floating Debris and Deadheads
11. Wildlife Impact
12. Livestock Impact
13. Compatible Activities Planned for Designated Areas
14. Water Quality

Interested in Development

Yes	85.7%
No	14.2%
	99.9%

Responses from:

Pincher Creek Fish and Game Association
Pincher Creek Lions Club
The Royal Canadian Legion, Branch #43
Cowley Recreation Board
Foothills Protective Association
Pincher Creek Regional Parks and Recreation Board
Alberta Environment, Pincher Creek
Archaeological Society of Alberta

Guidelines for Submissions
Youth Questionnaire Results
Oldman River Dam Project

1. Views Concerning Potential of Resource

Positive for Recreation	52.6%
Positive for Tourism	15.7%
Create Business	5.2%
Negative for Tourism	10.5%
Negative for Recreation	10.5%
Negative for Development	5.2%
	99.7%

2. Views Regarding Development of Cultural and Historic Resources in the Reservoir Area

Good Idea	65.0%
Bad Idea	35.0%
	100.0%

3. Use of Specific Themes, etc. for Development of Cultural/Historic Components of the Reservoir Area

Yes	72.7%
No	27.2%
	99.9%

4. Timing of Recreation/Tourism Facility Development

Immediately	88.2%
5 Years	11.7%
10 Years	0.0%
	99.9%

Responsibility for Development

Government	91.6%
Private Sector	8.3%
	99.9%

5. Interest in Developing, Operating or Managing Opportunities

Yes	40.0%
No	60.0%
	100.0%

Part III

Public Response - Opportunities/Concerns/Actions

The following table outlines the perceived opportunities and concerns stated by several organizations in the region. The table also summarizes some of the proposed actions stated by each of the organizations to better promote recreation and tourism at and around the proposed Oldman Reservoir site.

Organization	Perceived Opportunities	Perceived Concerns	Proposed Actions
Archaeological Society of Alberta	1. Development of interpretive displays in non-sensitive areas for public uses (e.g. geological, archaeological and historical development).	1. Loss of non-renewable resources: (a) reservoir area (b) impact (potential) from shoreline tourism development.	1. Undertake intensive archaeological surveys in primary study area. 2. Salvage material to be flooded. 3. Identify sites that may be impacted from shoreline recreation development. 4. Development of interprative program depicting history of valley corridor.
Oldman River Recreation Advisory Group	1. Public campground and day use areas. 2. Boat launch areas to support sport fishing, pleasure boating and wind surfing. 3. Interprative Centre (archaeology) including trails. 4. Toboggan–luge run.	1. Design to be cognizant of adverse wind conditions on shoreland activities. 2. Impact of increased recreation traffic on local roads. 3. Loss of privacy to adjacent property owners. 4. Impact of fluctuating water levels on recreation uses. 5. Safety to residents/tourists. 6. Lack of treed vegetation to support attractive site developments. 7. Public input to planning process. 8. Potential sites retained by government until plan finalized.	1. Unique design–contruction to mitigate against wind impacts. 2. Evaluate–upgrade roads that may be impacted. 3. Initiate tree planting at an early date. 4. Ensure garbage/sewage disposal at development sites. 5. Ensure signage, fencing, etc. of private lands against unauthorized use. 6. Maximize high water levels during recreation season to support recreation uses. 7. Public development of campgrounds, day use areas for land and water uses. 8. Specialized winter recreation development for local/non–local uses.
Pincher Creek Lions Club	1. Recreation facility development 2. Development will enhance local business and tourist trade in Pincher Creek and area.	1. General planning–design considerations.	
Royal Canadian Legion	1. Indicated general interest in recreation development.	1. None identified.	1. None identified – to be examined further further by local group.

Organization	Perceived Opportunities	Perceived Concerns	Proposed Actions
Cowley Recreation Board	1. Creation of small lakes by damming coulees. 2. Creation of 4-6 boat ramps to support sport fishing. 3. Development of extended stay campgrounds and trails. 4. Forestation of shoreland areas. 5. Snow/toboggan and cross-country ski trails and runs. 6. Identify cottage development area. 7. Special use area at dam. 8. Utilize Cowley airport for gliders and small aircraft.	1. Wind impact-development should be oriented to S.W. site of reservoir. 2. Potential conflict between cattle and recreationists. 3. Wildlife preservation in corridor(s).	1. Initiate creel census to assist management of reservoir fishing population. 2. Mitigate impact to wildlife through forest management plan.
Foothills Protective Association	1. Development of camping and boating facilities. 2. Construction of an interpretive centre (human-natural history). 3. Create small lake on Tennessee Creek.	1. Suggest limited potential for recreation and tourism development. 2. Facility development and recreation activities limited by: fluctuating water levels, unstable-slumping shoreline, excessive wind and limited treed-topographic shelter, wind impacting upon boating, and dust from expensive mud flats. 3. Potential impact with farm activities including: recreation-wildlife (farming conflict in use of coulees); conflict between agricultural practices (feed lots), gravel operations and potential recreation uses; and increased trespassing and theft. 4. Increased tax burden from publicly funded recreation developments. 5. Limited sport fishing; not an attraction.	1. Planting of shelter belts. 2. Detailed design and construction of certain facilities at an early stage; others to be built after reservoir is filled.

Organization	Perceived Opportunities	Perceived Concerns	Proposed Actions
Pincher Creek Regional Parks and Recreation Board	1. Anticipate reservoir will have a great potential for recreation, both to local residents and tourists. 2. Dam area is ideal location for park with: picnicking, walking-hiking, trail riding, sports, interpretation. 3. Regional destination recreation facilities that will attract tourists with private-public developments (campground, water-based facilities).	1. Identified several environmental concerns including: incompatible recreation form - recreation uses; mud shorelines (unsightly); floating debris-deadheads impacting on boating; good water quality for sport fishing. 2. Appropriate mix of facilities and activities: day use, extended stay, beaches, marinas, private and public sector developments.	1. Major regional park development to serve locals and attract tourists. 2. Green space-park at dam area.
4-H Beef Club	1. Identified the following facilities/activites: hiking trails, riding trails, sport fishing, swimming, boating for pleasure and camping.	1. Unsightly shoreland development.	1. No response.
Pincher Creek and District Economic Development Board	1. A safe family boating facility should be developed as a major tourist attraction. 2. Boat ramps. 3. Construction of a seperate natural swimming area close to the reservoir. 4. Marina development. 5. Development of fishing areas and stocking programs of rivers upstream. 6. Camping area with food establishment. 7. Cultural and historical interpretive centre in the village of Cowley.	1. Care must be taken to develop complimentary facilities in keeping with a coordinated tourism plan. 2. Bylaws to permit development would have to be revised. 3. Opposition by landowners. 4. Access should be well defined and controlled. 5. Poor weather conditions (wind) requires development in protected areas.	1. Public input process should be established during planning phase.

Appendix B

RECREATION USE ESTIMATION MODEL

Oldman Reservoir

Appendix B

1. RECREATION USE ESTIMATION MODEL - OLDMAN RIVER RESERVOIR

Use of the proposed reservoir site for traditional reservoir recreation should represent the largest proportion of total use. To estimate the amount of use which could realistically be expected, four existing provincial parks (Beauvais Lake, Chain Lake, Little Bow Lake and Police Outpost) with flatwater recreation opportunities were considered. The annual user statistics and the 1976 License Plate Survey by Alberta Recreation and Parks were used to determine existing levels and visitor origin to the four parks.

From analysis of the visitor origin data, it was found that four Alberta cities (Edmonton, Calgary, Lethbridge and Medicine Hat) account for 72% of total visitation to these four parks. Based upon the factors of distance from each park to the respective city, city population growth from 1975 to 1985, and the amount of use to each park from each city, step-wise multiple regression generated a non-linear equation which was used to estimate future demand for the projected future population levels. For the purposes of this study, the equation provides an indication of the approximate levels of demand which may be expected. The estimates produced by the equation serve as the base for calculating the projected minimum demand for traditional recreation at the reservoir. These estimates should be used as guidelines in future detailed planning and design investigations. Because of the proximity to Highway 3 and the other associated demand factors discussed above, the proposed reservoir has the potential to capture significant resident and non-resident user traffic for various specific recreation activities.

The estimate generated by the equation was developed **only** for the number of camping parties from the four identified population centres. This value was then adjusted according to the proportion of total camping parties attributed to these population centres, to determine the total number of visitors to the park. The specific calculations are outlined in the following discussion.

Using a 1976 license plate survey conducted by Alberta Recreation and Parks and comparing these figures to the 1985 visitor origin survey also conducted by Alberta Recreation and Parks, visitor origins for the four sample provincial parks offering flat water-based recreation in southern Alberta were established. By determining the origin of the visitors and how many visitors came from each area in the survey years, travel patterns recreationalists were established. The specific data elements/steps used in developing the model are listed below:

1) 1976 visitation for each park incorporated into the 1985 visitor origin survey conducted.
2) Establish from the surveys which population centres contributed the highest visitation to each of the four parks.
3) Determine the travel distances from each of the population centres to each of the four parks.
4) Determine the water surface area of the waterbody at each of the four parks.

This specific data is listed below:

a) Population centre visits:

Calgary	47%
Lethbridge	17%
Edmonton	4%
Medicine Hat	4%
Total	72%

b) Determine travel distance:

	Calgary	Edmonton	Lethbridge	Medicine Hat
Beauvais Lake	235 km	532 km	126 km	243 km
Little Bow	122 km	452 km	88 km	252 km
Chain Lakes	121 km	420 km	138 km	333 km
Police Outpost	252 km	550 km	103 km	267 km

c) Determine water surface area:

Beauvais Lake	76 ha
Little Bow	2331 ha
Chain Lakes	321 ha
Police Outpost	50 ha

Statistical analysis of similar recreation survey data in the United States indicated that the two most significant factors influencing visitation are travel distance and waterbody attractiveness as measured by size. Travel distance has a negative correlation with visitation, meaning that as distance increases away from the waterbody, a corresponding decrease in the number of visitors from the population centre will occur. In contrast, the size of the waterbody has a positive correlation, meaning that a larger surface area will attract more visitors over a greater distance than a smaller surface area. Through step-wise non-linear regression, the relationships between the above noted elements are found to exist in the following equation.

The following calculations are outlined to illustrate these relationships and estimated use projections.

$$\text{Use} = \frac{39.261 \times \text{pop}^{0.9787} \times \text{area}^{0.3645}}{\text{distance}^{0.4989}}$$

To estimate the future use at the reservoir site, the proposed water surface area, travel distances from the population centre to the Oldman Reservoir and the project populations for the study years for each population center are entered into the equation (see figures below).

a) Proposed water surface area = 2768 ha

b) Travel distance:

Calgary	195 km
Edmonton	489 km
Lethbridge	89 km
Medicine Hat	247 km

2. FACILITY REQUIREMENT CALCULATIONS

The concept utilized to determine facility requirements is termed the Design Day Load (DDL). The DDL represents the level of use which could be expected on a typical weekend day of the peak use month. This level of facility development is intended to optimize the utilization of facilities, recognizing that on holiday weekends this level will be exceeded. It is well recognized that to design and develop facilities for maximum holiday weekend use, a reduction in the occupancy rates of these facilities would occur during the mid-week periods. The formula for computing DDL is:

$$DDL = \frac{AV \times PM \times WU}{WD}$$

Where AV = Annual project visitation

PM = Proportion of annual use occurring in the peak month

WU = Proportion of weekly use occurring on the weekend

WD = Number of weekend days in the peak month

The values for PM and WU for the study area have been determined as 26.5% and 45.8% respectively, and the number of weekend days (WD) is assumed to be 8.5. Therefore, the DDL's for the proposed reservoir site for the study years are calculated below:

Model Estimation 1985:

$$DDL = \frac{52,916 \times 0.265 \times 0.458}{8.5} = 756 \text{ Visitors}$$

Model Projection 1995:

$$DDL = \frac{60,703 \times 0.265 \times 0.458}{8.5} = 866 \text{ Visitors}$$

Model Projection 2005:

$$DDL = \frac{68,055 \times 0.265 \times 0.458}{8.5} = 972 \text{ Visitors}$$

c) Projected population:

Year	Calgary	Edmonton	Lethbridge	Medicine Hat
1985	625,143	560,085	59,901	41,717
1995	725,165	644,097	67,089	47,140
2005	825,188	728,100	74,277	52,503

The results of the calculations are shown below:

1985 = 11,811 model estimation
1995 = 13,549 projected model
2005 = 15,190 projected model

To determine the total projected recreation use (visitor days) several additional calculations are required which utilize statistics from each of the four sample lakes.

1985 = 11,811 camper nights from the four population centres

a) $\frac{11,811}{.72}$: 72% of use from population centres

= 16,404 total camper nights

b) $\frac{16,404}{.31}$: camping = 31% of total use

= 52,916 visitations of recreation use

1995 = 13,549 camper nights from the four population centres

a) $\frac{13,549}{.72}$: 72% of use from population centres

= 18,818 total camper nights

b) $\frac{18,818}{0.31}$: camping = 31% of total use

= 60,703 visitations of recreation use

2005 = 15,190 camper nights from the four population centres

a) $\frac{15,190}{.72}$: 72% of use from population centres

= 21,097 total camper nights

b) $\frac{21,097}{.31}$: camping = 31% of total use

= 68,055 visitations of recreation use

From the above calculation, the minimum total projected traditional reservoir recreation use for the proposed reservoir site is:

1985 = 52,916 model estimation
1995 = 60,703 model projection
2005 = 68,055 model projection

Activity use estimates have been prepared for the proposed reservoir site using information from other water-based opportunities and tourist information survey both conducted in the vicinity and adjusted for site specific considerations at the Oldman Reservoir. The total percentages may exceed 100% since most visitors will participate in more than one activity while at a development node on the reservoir.

Activity	Participation
Picnicking	69.9%
Swimming	76.4%
Water Skiing	24.2%
Power Boating	36.9%
Canoeing	15.0%
Sailing	9.4%
Fishing (boat)	51.8%
Camping	31.0%
Wind Surfing	20.0%

Facility Requirements =

DDL x participation ÷ [a] camper party size or day use party size (picnic)

[b] turnover rate

[c] linear metres of shoreline

[d] assuming 50% of fishing occurs from boat

[e] average boating party

Camping:

1985: $756 \times .31 \div 2.9^{a} = 81$ sites

1995: $806 \times .31 \div 2.9^{a} = 86$ sites

2005: $972 \times .31 \div 2.9^{a} = 104$ sites

NOTE: 31% camping represents figures compiled by the Pincher Creek and District Economic Development Board, 1985. All remaining participation rates are compiled from the Public Opinion Survey on Recreation, Alberta Recreation and Parks, 1984 and discussions with product suppliers.

Picnicking:

1985: 756 x .699 ÷ 2.73^a ÷ 2^b = 97 sites
1995: 866 x .699 ÷ 2.73^a ÷ 2^b = 111 sites
2005: 972 x .699 ÷ 2.73^a ÷ 2^b = 124 sites

Parking:

1985: 97 ÷ 2.73 ^{a} = 35 spaces
1999: 111 ÷ 2.73 ^{a} = 40 spaces
2005: 124 ÷ 2.73 ^{a} = 45 spaces

Swimming:

1985: 756 x .764 ÷ 1.5^b x 1.0^c = 385m shoreline
1995: 866 x .764 ÷ 1.5^b x 1.0^c = 441m shoreline
2005: 972 x .764 ÷ 1.5^b x 1.0^c = 495m shoreline

Parking:

1985: 756 x .764 ÷ 2.73 ^{a} ÷ 1.5 ^{b} = 141 spaces
1995: 866 x .764 ÷ 2.73 ^{a} ÷ 1.5 ^{b} = 161 spaces

Boating:

Water Skiing:
1985: 756 x .242 ÷ 3.0^a = 61 boats/day
1995: 806 x .242 ÷ 3.0^a = 70 boats/day
2005: 972 x .242 ÷ 3.0^a = 78 boats/day

Power Boating:
1985: 756 x .369 ÷ 2.75^e = 101 boats/day
1995: 866 x .369 ÷ 2.75^e = 116 boats/day
2005: 972 x .369 ÷ 2.75^e = 130 boats/day

Sailing:
1985: 756 x .20 ÷ 1.75^e = 86 boats/day
1995: 866 x .20 ÷ 1.75^e = 99 boats/day
2005: 972 x .20 ÷ 1.75^e = 111 boats/day

Wind Surfing:

1985: $756 \times .20 \div 1.0^{e} \div 1.5^{b} = 101$ boards/day

1995: $866 \times .20 \div 1.0^{e} \div 1.5^{b} = 115$ boards/day

2005: $972 \times .20 \div 1.0^{e} \div 1.5^{b} = 130$ boards/day

Fishing:

1985: $756 \times .518^{d} \div 2.0^{e} = 196$ boats/day

1995: $866 \times .518^{d} \div 2.0^{e} = 224$ boats/day

2005: $972 \times .518^{d} \div 2.0^{e} = 252$ boats/day

Canoeing:

1985: $756 \times .15 \div 2.5^{e} = 45$ canoes/day

1995: $866 \times .15 \div 2.5^{e} = 52$ canoes/day

2005: $972 \times .15 \div 2.5^{e} = 58$ canoes/day

Total Boating Requirements:

1985 = 590 boats/day (all boats and windsurfers/day)

1995 = 456 boats/day (all boats and windsurfers/day)

2005 = 512 boats/day (all boats and windsurfers/day)

1985:

a) Launch Requirements = 590 boats/day
Launch Lanes @ 50 launchings/lane/day = 11 launch lanes

b) Trailer Parking @ 35 spaces/lane = 385 trailer parking spaces

c) Single Car Parking @ 10% of trailer parking = 58 single car spaces

1995:

a) Launch Requirements = 676 boats/day
Launch Lanes @ 50 launchings/lane/day = 13 launch lanes

b) Trailer Parking @ 35 spaces/lane = 455 trailer parking spaces

c) Single Car Parking @ 10% of trailer parking = 45 single car spaces

2005:

a) Launch Requirements = 512 boats/day
   Launch Lanes @ 50 launchings/lane/day = 10 launch lanes

b) Trailer Parking @ 35 spaces/lane = 350 trailer parking spaces

c) Single Car Parking @ 10% of trailer parking = 35 single car spaces

NOTES:

* Additional calculations for wind surfers are not required as power boats and wind surfers are **not** attracted to the reservoir at the same time during the same weather conditions.

* Launch lane, trailer parking and single car parking guidelines established from previous studies in Canada and the United States.

3. TRAVELLER CAMPING CALCULATIONS

To estimate the actual number of vehicles which would utilize this type of facility at the proposed reservoir, the Average Summer Daily Traffic (ASDT) for Highway No. 3 has been projected to 1995 and 2005 using the annual increase between 1980 through 1985. According to Alberta Transportation (1986), projections of future highway traffic in the study area utilize an annual increase of 2-4%. To better estimate the actual number of traveller camping parties who visit the reservoir, an average capture rate compiled from various similar parks has been established at .0025 (See Table B1).

The calculation of visitors is provided below using the projected ASDT for each of the periods.

Total Projected Visitors*

* Figures taken from a two-way ASDT Count station 3km west of Highway 2 on Highway 3 (permanent)

1985:

ASDT = 3,800
Capture = .0025
Days in Recreation Season = 123 (May 15 to Sept. 15)
Passengers/Vehicle = 2.7

Traveller Camping Parties = 3,800 x .0025 x 123 = 1,168
Visitors = 1,168 x 2.7 = 3,154

1995:

ASDT = 4,560
Capture = .0025
Days in Recreation Season = 123 (May 15 to Sept. 15)
Passengers/Vehicle = 2.7

Traveller Camping Parties = 4,560 x .0025 x 123 = 1,402
Visitors = 1,402 x 2.7 = 3,785

2005:

ASDT = 5,320
Capture = .0025
Days in Recreation Season = 123 (May 15 to Sept. 15)
Passengers/Vehicle = 2.7

Traveller Camping Parties = 5,320 x .0025 x 123 = 1,636
Visitors = 1,636 x 2.7 = 4,417

Campsite Requirements

The following calculations project the additional camping sites required to accommodate the traveller camper parties, using ASDTs and the average capture rate as indicated previously.

1985:

ASDT = 3,800
Capture = .0025
Camping Parties = 10 campsites

1995:

ASDT = 4,560
Capture = .0025
Camping Parties = 11 campsites

2005:

ASDT = 5,320
Capture = .0025
Camping Parties = 13 campsites

When these requirements are included with the traditional reservoir recreation camping facility needs as discussed in 2), a minimum total of sites for the years 1985, 1995 and 2005 are as follows:

1985 = 91 sites
1995 = 104 sites
2005 = 117 sites

Table B-1
Traveller Camper Capture

Park	Highway Count Location	1985 ASDT[1]	1985 Total Summer Season Traffic[2]	1985 One Night Camp Permits[3]	Estimated Percent Transient[4]	Total Transient Camping Parties	Capture
Bow Valley	1 + 40 at Seebe	12,820	1,576,860	4,167	60%	2,500	.0016
Kinbrook Island	1 + 873 N. of Brooks	7,830	983,090	4,255	15%	638	.0006
Tillebrook	1 + 875 to Rolling Hills	5,710	702,330	4,448	95%	4,225	.0060
Queen Elizabeth	2 + 35 N. of Grimshaw	4,740	583,020	1,244	40%	498	.0008
Taber	3 + 36 W. of Taber	6,770	832,710	1,902	15%	285	.0003
Crimson Lake	11 + 22 W. of Rocky Mtn House	6,820	838,860	7,349	75%	5,512	.0065
Jarvis Bay	11 + 20 East of Sylvan Lake	6,850	842,550	7,890	30%	2,367	.0028
Wabamun	16 + 765 to Glenevis	4,800	590,400	5,678	10%	568	.0009
Vermillion	16 + 41 S. of Vermillion	5,600	688,800	2,631	70%	1,842	.0026
Williamson	34 + Forestry Trunk Road E. of Bezanson	3,360	413,280	2,444	48%	1,173	.0028

Average Capture Rate = .0025

1) Alberta Transportation, ASDT = Average Summer Daily Traffic; 2) Based on May 15 - Sept. 15 season of 123 days; 3) Alberta Recreation and Parks camping permit receipt; 4) As estimated by individual park operators.

Appendix C

FIXED ROOF ACCOMMODATION

Oldman Reservoir

Appendix C
Fixed-Roof Accommodation

Based on the 1986 Alberta Accommodation Guide, the study region has approximately 33 major fixed-roof accommodations totalling 1,369 units (as outlined in Table C-3).

Average occupancy in the region as suggested by Travel Alberta ranged from 60.3% in 1983 to 48.8% in 1984, thus reflecting the slight overall decline felt throughout Alberta for these years. It seems that this trend, according to Travel Alberta, may continue. However, with the recent heightened interest in auto touring holidays on this continent by Americans and Canadians, occupancy rates in southern Alberta may increase dramatically over the next two years for hotels and motels that have enough units to accommodate the bus tours.

Table C-1 suggests lodging projections to the year 2001. The base for this data was comprised in 1983, however, it still reflects a consistent trend. Table C-1 indicates that 1986 would require 772 units, 1991 require 1016 units and for 2001, 1430 units would be required to meet demands for lodging. Therefore, the model confirms that the immediate area has an over abundance of lodging units, resulting in relatively low occupancy levels. In testing the validity of these projections, 1986 should be carefully monitored to record any increase in occupancy levels as a result of drive-through traffic to Vancouver for Expo '86. It is anticipated that any positive trends established in 1986 will be short-lived and not necessarily reflected in the next several years. A general increase in U.S. traffic from both tour buses and automobiles, however, is projected.

Past surveys indicate that Chinook Country attracts a varied clientele. Table C-2 indicates the prime purpose of travel for individuals using fixed-roof accommodation.

Table C-1

Lodging Requirement Projections

	Overnight Visits (person-trips)						Total Demand (person nights)	Multiple Occupancy[4] Factor (annual unit nights)	Daily % occupancy (.54)[5]	% of Use by Tourist	Total Units Required
	Summer[1]			Non-Summer							
	@ 16%[2]		and 3.09[3]	@ 30%[2]		and 1.85[3]					
1986	100,047	-	60,348	97,462	-	54,091	114,439	54,755	278	.36	772
1991	128,483	-	77,500	125,431	-	69,641	147,141	72,127	366	.36	1,016
2001	184,369	-	111,211	173,099	-	96,070	207,281	101,608	515	.36	1,430

1) June, July, August
2) Percentage of total using fixed roof accommodations
3) Average trip length - days/nights
4) Average number of people per unit = 2.04
5) Average for Area 1, 1983 to 1984; daily equals annual unit nights ÷ 365
6) Motel/hotel occupancy 1981-82 Chinook Country Tourism Destination Area Study = 30%

NOTE: a) Overnight visits (person trips) utilize 1983 figures
b) Data 1 to 6 based on 1985-86 information
c) Total units required suggests realistic, conservative figures.

Table C-2

1982 Motel/Hotel Occupancy

Purpose of Travel	Percent
Industrial/Commercial	56%
Tourism	36%
Groups/Meetings	7%
Other	2%

Source: Chinook Country Tourism Destination Area Study

Table C-3

1985 Accommodation Inventory

Town	Hotel/Motel	Units	Total Units
Coleman	Stop Inn Motel	24	24 units
Blairmore	Blairmore Motel	17	
	Cedar Inn	47	
	Cosmopolitan Inn	16	
	Highwood Motel	32	112 units
Frank	No listing		
Pincher Creek	Foothills Motel	30	
	Heritage Inn	43	
	Parkway Motel	41	
	Stardust Motel	14	
	Westcastle Inn	17	145 units

Town	Hotel/Motel	Units	Total Units
Fort MacLeod	Century II Motel	14	
	D.J. Motel	15	
	Foothills Motel	28	
	Fort Motel	15	
	Kozy Motel	13	
	Sunset Motel	22	81 units
Cardston	Evergreene Motel	15	
	Flamingo Motel	20	
	Kozy Motel	15	50 units
Claresholm	Bluebird Motel	23	
	Golden Pheasant Motel	30	
	Sportsman Motor Inn	42	95 units
Lethbridge	Bridge Townhouse Motel	37	
	El Rancho Motor Hotel	106	
	Flagstone Motel	23	
	Heidelberg Inn	67	
	Lethbridge Lodge Hotel	191	
	Lethbridge Travel Lodge	32	
	Lodge Motel	94	
	Park Plaza Motor Hotel	64	
	Pepper Tree Inn	56	
	Sandman Inn	138	
	Sundance Inn	54	862 units
	Total Region		1369 units

Appendix D

RECREATION USE ESTIMATION MODEL

Regression Analysis
Oldman Reservoir

RECREATION USE ESTIMATION MODEL

YEAR	POP. x1000	DIST. km	AREA ha	SPECIFIC use	GENERAL use
1985	625.14	195.00	2768.00	7007.95	4865.56
	560.09	489.00	2768.00	936.30	1227.63
	59.90	89.00	2768.00	3577.16	2945.33
	41.72	252.00	2768.00	290.33	526.26
				11811.73	9564.782
1995	725.17	195.00	2768.00	8104.87	5388.25
	644.10	489.00	2768.00	1073.70	1351.45
	67.89	89.00	2768.00	4044.00	3210.07
	47.14	252.00	2768.00	327.26	572.39
				13549.84	10522.14
2005	825.18	195.00	2768.00	9198.66	5888.77
	728.11	489.00	2768.00	1210.75	1470.30
	74.28	89.00	2768.00	4416.60	3414.85
	52.56	252.00	2768.00	364.09	616.86
				15190.10	11390.77

```
        regress -e < b.dat
Analysis for 6 points of 4 variables:
Variable          REG          A           B          C
Min            5.7200     4.4800      3.8700     5.7700
Max            9.7500     6.1100      6.4400     7.7800
Sum           46.0000    31.7600     33.5000    42.6600
Mean           7.6667     5.2933      5.5833     7.1100
SD             1.5781     0.6970      1.2449     1.0380

Correlation Matrix:
REG            1.0000
A             -0.7477     1.0000
B              0.4137     0.2607      1.0000
C             -0.0164    -0.1408     -0.4988     1.0000
Variable          REG          A           B          C

Regression Equation for REG:
REG  =  -2.0723 A  +  0.9787 B  +  0.3648 C  +  10.578124

Significance test for prediction of REG
    Mult-R  R-Squared     F(3,2)   prob (F)
    0.9999     0.9998  3967.3383     0.0003

C:\UNIX>lot
```

```
regress -e < use.dat
Analysis for 16 points of 4 variables:
Variable             REG           A           B           C
Min               5.3500      4.4800      3.8700      3.9100
Max               9.7500      6.3100      6.4400      7.7800
Sum             116.0500     87.5500     82.9200     87.1600
Mean              7.2531      5.4719      5.1825      5.4475
SD                1.3789      0.6414      1.2452      1.5627

Correlation Matrix:
REG               1.0000
A                -0.5057      1.0000
B                 0.4548      0.2522      1.0000
C                 0.1012     -0.0888      0.0000      1.0000
Variable             REG           A           B           C

Regression Equation for REG:
REG  =  -1.4157 A  +  0.6875 B  +  0.0377 C  +  11.23105

Significance test for prediction of REG
    Mult-R  R-Squared      F(3,12)    prob (F)
    0.7871     0.6196       6.5152      0.0073

C:\UNIX>
```

MAPS
NOT
FILMED

CARTES
OMISES